EXHIBIT LIST FOR SUB 2021-004/EA 2021-014
Preliminary Plat of Mammoth Acres

			DATED
Planning Commission Memo Exhibit List - July 13, 2021			
PCM 1 Includes:	PCM 1.1	Staff Report	June 18, 2021
	PCM 1.2	Site Map	May 20, 2021
	PCM 1.3	Notice of Public Hearing	June 23, 2021
		APPLICATION SUBMITTAL	
	PCM 1.4	Subdivision Application	May 8, 2021
	PCM 1.5	Plat Map	May 7, 2021
		SEPA INFORMATION	
	PCM 1.6	Environmental Checklist EA 2020-007	May 6, 2021
	PCM 1.7	Notice of Application	May 20 ,2021
	PCM 1.8	Mitigated Determination of Non Significance	June 10, 2021
	PCM 1.9	Preliminary Storm Drainage Report	May 7, 2021
		COMMENTS	
	PCM 1.10	Benton Franklin Health District	April 28, 2021
	PCM 1.11	City of Kennewick - Public Works Comments	May 20, 2021
	PCM 1.12	Benton County Fire Marshal	May 21, 2021
	PCM 1.13	Benton PUD Comments	May 26, 2021
	PCM 1.14	Dept. of Arch. & Historic Preservation	June 3, 2021
	PCM 1.15	Benton County Public Works	June 7, 2021
	PCM 1.16	Dept. of Ecology	June 7, 2021
	PCM 1.17	Benton Franklin Health District	June 9, 2021
	PCM 1.18	Benton County Public Works	June 16, 2021
Planning Commission CONTINUED Hearing Exhibit List August 10, 2021			
	PCM 2.1	Staff Memo for Continued Hearing	August 3, 2021
	PCM 2.2	Public Works **Revised** Comments`	August 3, 2021
Planning Commission Hearing Exhibit List - August 10, 2021			
	PCH 1.1		
	PCH 1.2		
	PCH 1.3		
Board of County Commissioners Memo Exhibit List - DATE			
Includes:	BCCM 1.2		
	BCCM 1.3		
	BCCM 1.4		

The Exhibit Numbers are found in the Top Right Hand Corner of each document.
PCM = Planning Commission Memo Exhibits
PCH = Planning Commission Hearing Exhibits
BCCM = County Commissioner Memo Exhibits

Community Development Department
Prosser Office: 620 Market Street, 1st Floor
Kennewick Office: 102206 East Wiser Parkway
www.co.benton.wa.us

Planning Division
(509) 786-5612
P.O. Box 910, Prosser, WA 99350
planning.department@co.benton.wa.us

PCM 2.1

STAFF REPORT TO THE BENTON COUNTY PLANNING COMMISSION

FILE NO:	**CONTINUED PUBLIC HEARING SUB 2021-004** **Preliminary Plat of Mammoth Acres**
MEMO DATE:	August 3, 2021
CONTINUED HRG DATE:	August 10, 2021
APPLICANT:	Rob Duncan dba R3T Ventures, LLC 2410 N 4th Ave Pasco, WA 99301
OWNER:	John Vinyard 1417 Waterford Green Dr Marietta, GA 30068
LOCATION:	The site is located approximately 1,000 feet east of the intersection of Cantera Street and Clodfelter Road in the west 800 feet of the northeast quarter and that portion of the southeast quarter lying north of Clodfelter Road, in Section 23, Township 8 North, Range 28 East, W.M. on parcel number 1-2388-100-0003-000.
PROPERTY SIZE:	Approximately 71.50 acres
AREA TO BE USED:	Approximately 67.18 acres
LAND USE:	Residential
COMP. PLAN:	Rural Remote
ZONING:	Rural Lands Five Acre District
SUGGESTED STAFF RECOMMENDATION:	**Positive recommendation** subject to eight (8) findings of fact and seventeen (17) conditions of approval.

APPLICATION SUMMARY

This item was scheduled before the Planning Commission on July 13, 2021 however due to a lack of a quorum of the Planning Commission members, the hearing was continued to August 10, 2021 at 6 p.m., in the Planning Meeting Room, First Floor, Courthouse, Prosser WA.

During this time the Public Works Department has done further review on their conditions of approval as it relates to E 297 PR SE and has discovered the existence of a 60-foot-wide parcel of unknown ownership located between the boundaries of short plats 1375, 2314, 2842 and 1085, located immediately east of the subject parcel. Based on this new information, they have submitted new comments (PCM 2.1) and requirements for this subdivision.

Please find the new Findings of Fact and conditions of approval based on Public Works revised comments (PCM 2.1). Findings of Fact item number 1 within PCM 1.1 will no longer apply and are to be

replaced with the Findings of Fact outlined below. Conditions of Approval 2.a, 2.b, 5.c.ii, will 5.d.ii are to be replaced to reflect Public Works comments outlined in PCM 2.1 as noted below.

REVISED FINDINGS OF FACT:

2.a Reference the Benton County Public Works Department comments as it relates to stormwater and drainage easements (PCM 2.1); and

2.b Reference the Benton County Public Works Department comments as it relates to roads and mitigation requirements (PCM 2.1).

5.c.ii Reference the Benton County Public Works Department comments as it relates to stormwater and drainage easements (PCM 2.1).

5.d.ii Reference the Benton County Public Works Department comments as it relates to road and mitigation requirements (PCM 2.1).

REVISED CONDITIONS OF APPROVAL:

1. Applicant shall meet and comply with the requirements of the **Benton County Public Works Department**, including the following:

    a. During the review of the above subdivision Public Works discovered the existence of a 60' wide parcel of unknown ownership, parcel numbered 123881008888888 located between the boundaries of short plats 1375, 2341, 2842, and 1085. This parcel currently contains a portion of E 297 PR SE and the approach serving the parcels to the south. E 297 PR SE begins at Clodfelter Road and extends through the subject parcel of the proposed preliminary plat and continues west serving several other parcels. Local residents being served by 297 PR SE will be negatively impacted by the addition of 12 lots, as their gravel access will likely be used as a short cut. Additional traffic to that portion of297 PR SE between Clodfelter Road and the proposed road for the development from the development is anticipated. This will impact those who pay to manage that portion of the road and will increase dust emissions.

    b. In order to mitigate for the increased traffic impact, the developer shall provide a bond for the construction of a County road on parcel 123881008888888, the value of said bond shall be mutually agreed upon by the County Engineer and the applicant. The County will investigate the true ownership of the above-mentioned parcel with the intent to acquire the parcel for future road right-of-way if reasonably practical in the view of the County.

    c. Prior to final plat approval, a contract outlining the Developer's intent to pave a new County Road within the boundaries of the 60' wide parcel 123881008888888 if or when the parcel becomes County road right-of-way will be signed by the County and the Developer and shall be approved by the Board of County Commissioners.

    d. The Developer shall improve that portion of297 PR SE lying east of the intersection of the proposed new County road (running north/south) contained wholly within parcel 123881000003000 to meet current County standards, and 60 feet of right of way shall be dedicated to the County. That portion West of the new proposed road shall remain in its current condition except for the addition of a paved road approach connecting to the new proposed road, following standard R-4.

e. The developer shall provide a complete set of engineered construction drawings for review and approval by the County and associated utilities. The drawings shall contain all appropriate information listed on the attached Minimum Plan Requirements. Grading plan will include grading to shape any drainage easements to route and fully contain all runoff based upon the 100- year storm within the easement limits. All plans and associated repo1ts shall be prepared by a Professional Engineer licensed to practice in the State of Washington.

f. All construction shall be in accordance with the most current WSDOT Standard Specifications for Road, Bridge and Municipal Construction, applicable Benton County Standard Plans and the requirements of the County Engineer.

g. All roads within this plat shall have a paved width of 24 feet with a minimum 2-foot gravel shoulder. Roadways shall be designed for a minimum 25 mile per hour design speed.

h. The pavement return radius at all intersections shall be a minimum of 35 feet.

i. All stormwater from the roadways shall be contained on the plat and shall utilize surface infiltration (ditches, swales, ponds) for detention. The developer shall have an infiltration test performed at each proposed detention area. Tests shall be done with an infiltrometer using the falling head or constant head method. Other methods of infiltration rate determination shall be approved by the County.

j. The developer shall provide a complete stormwater runoff report developed in accordance with the Stormwater Management Manual for Eastern Washington accosting for all impervious and pervious surfaces draining to the roadside ditches. Design storm shall be a Modified SCS Type IA with a 25-year return frequency.

k. All signage including but not limited to stop signs, speed limit signs and street name signs shall be installed by the developer in accordance with Benton County Standard Plans.

l. All new power, telephone, cable TV and irrigation shall be installed outside of the County right of way in the appropriate easements. Domestic water piping may be installed within the County right of way in accordance with a valid franchise agreement.

m. Survey monuments, with cases and covers per Benton County Standard R-14B, shall be placed at all road intersections, points of curvature, points of tangency, centers of cul-de-sacs, section corners and quarter corners. All monuments shall be set by a Professional Land Surveyor licensed to practice in the state of Washington.

n. Dedicate 60 feet for County right of way extending from the cul-de-sac to the boundary line of lot 6 and 7.

o. Existing multi use access to Clodfelter shall be improved to meet current County standards.

p. Access to parcels 123881012842001, 123881012842003, 123881011085002, 123881011375002, 123881012341002 shall be provided to the new County road, following standard R-3.

q. Pave the access from E 297 PR SE to the proposed new road following standard R-4 Urban Local Access. https://www.co.benton.wa.us/files/documents/R-4Standardasof4-25-_20172_l5l_l3525030519AM.pdf

r. Add the following notes to the final plat:

- Benton County is not responsible for the maintenance or upkeep of any stormwater retention facility or drainage easements. All such maintenance and upkeep are the responsibility of the underlying property owner.
- Prior to the construction of any driveway or the issuance of any building permit for any lot within this subdivision the property owner shall obtain a Road Approach Permit from the Benton County Public Works Department and install the required temporary construction access
- No trees, shrubs, weeds, fencing or other obstructions more than 24 inches in height are permitted within Benton County right of way
- Property owners that install grass, curbing, rock mulch or other landscaping within the County right of way do so at their own risk. The County will not repair or replace damaged landscaping due to construction or maintenance operations
- No lot in this subdivision shall have direct access to Clodfelter Road
- Lots 4 and 5 shall not have direct access to 297 PR SE

SUGGESTED MOTION:

The Planning Commission forwards a **recommendation of approval** to the Benton County Board of Commissioners for Application SUB 2021-004/EA 2021-014, subject to the eight (8) findings of fact and seventeen (17) conditions of approval as stated in the staff memos (PCM 1.1) dated June 18, 2021 and August 3, 2021 (PCM 2.1), which includes the preliminary plat approval for 12 residential lots and that the Chairman, in conjunction with the Secretary of the Planning Commission, prepare and adopt written findings and conclusions reflecting the commission's recommendation for approval that articulate and are consistent with the findings, conclusions and recommendations made by the Planning Commission tonight.

BENTON COUNTY WA
PUBLIC WORKS DEPARTMENT

TO: PLANNING DEPARTMENT

FROM: DOUGLAS D'HONDT

CC: CRISTINA WOODS

DATE:8/3/2021

SUBJECT: PRELIMINARY PLAT – SUB 2021-004 MAMMOTH ACRES & EA 2021-014

Please add the following as conditions of final approval for the above reference plat:

1. During the review of the above subdivision Public Works discovered the existence of a 60' wide parcel of unknown ownership, parcel numbered 123881008888888 located between the boundaries of short plats 1375, 2341, 2842, and 1085. This parcel currently contains a portion of E 297 PR SE and the approach serving the parcels to the south. E 297 PR SE begins at Clodfelter Road and extends through the subject parcel of the proposed preliminary plat and continues west serving several other parcels. Local residents being served by 297 PR SE will be negatively impacted by the addition of 12 lots, as their gravel access will likely be used as a short cut. Additional traffic to that portion of 297 PR SE between Clodfelter Road and the proposed road for the development from the development is anticipated. This will impact those who pay to manage that portion of the road and will increase dust emissions.

2. In order to mitigate for the increased traffic impact, the developer shall provide a bond for the construction of a County road on parcel 123881008888888, the value of said bond shall be mutually agreed upon by the County Engineer and the applicant. The County will investigate the true ownership of the above-mentioned parcel with the intent to acquire the parcel for future road right-of-way if reasonably practical in the view of the County.

3. Prior to final plat approval, a contract outlining the Developer's intent to pave a new County Road within the boundaries of the 60' wide parcel 123881008888888 if or when the parcel becomes County road right-of-way will be signed by the County and the Developer and shall be approved by the Board of County Commissioners.

4. The Developer shall improve that portion of 297 PR SE lying east of the intersection of the proposed new County road (running north/south) contained wholly within parcel 123881000003000 to meet current County standards, and 60 feet of right of way shall be dedicated to the County. That portion West of the new proposed road shall remain in its current condition except for the addition of a paved road approach connecting to the new proposed road, following standard R-4.

5. The developer shall provide a complete set of engineered construction drawings for review and approval by the County and associated utilities. The drawings shall contain all appropriate information listed on the attached Minimum Plan Requirements. Grading plan will include grading to shape any drainage easements to route and fully contain all runoff based upon the 100-year storm within the easement limits. All plans and associated reports shall be prepared by a Professional Engineer licensed to practice in the State of Washington

6. All construction shall be in accordance with the most current WSDOT Standard Specifications for Road, Bridge and Municipal Construction, applicable Benton County Standard Plans and the requirements of the County Engineer

7. All roads within this plat shall have a paved width of 24 feet with a minimum 2-foot gravel shoulder. Roadways shall be designed for a minimum 25 mile per hour design speed

8. The pavement return radius at all intersections shall be a minimum of 35 feet

9. All stormwater from the roadways shall be contained on the plat and shall utilize surface infiltration (ditches, swales, ponds) for detention. The developer shall have an infiltration test performed at each proposed detention area. Tests shall be done with an infiltrometer using the falling head or constant head method. Other methods of infiltration rate determination shall be approved by the County.

10. The developer shall provide a complete stormwater runoff report developed in accordance with the Stormwater Management Manual for Eastern Washington accosting for all impervious and pervious surfaces draining to the roadside ditches. Design storm shall be a Modified SCS Type IA with a 25-year return frequency.

11. All signage including but not limited to stop signs, speed limit signs and street name signs shall be installed by the developer in accordance with Benton County Standard Plans

12. All new power, telephone, cable TV and irrigation shall be installed outside of the County right of way in the appropriate easements. Domestic water piping may be installed within the County right of way in accordance with a valid franchise agreement

13. Survey monuments, with cases and covers per Benton County Standard R-14B, shall be placed at all road intersections, points of curvature, points of tangency, centers of cul-de-sacs, section corners and quarter corners. All monuments shall be set by a Professional Land Surveyor licensed to practice in the state of Washington

14. Dedicate 60 feet for County right of way extending from the cul-de-sac to the boundary line of lot 6 and 7

15. Existing multi use access to Clodfelter shall be improved to meet current County standards

16. Access to parcels 123881012842001, 123881012842003, 123881011085002, 123881011375002, 123881012341002 shall be provided to the new County road, following standard R-3
17. Pave the access from E 297 PR SE to the proposed new road following standard R-4 Urban Local Access

    https://www.co.benton.wa.us/files/documents/R-4Standardasof4-25-20172151135250305 19AM.pdf

Add the following notes to the face of the final plat

1. Benton County is not responsible for the maintenance or upkeep of any stormwater retention facility or drainage easements. All such maintenance and upkeep are the responsibility of the underlying property owner.

2. Prior to the construction of any driveway or the issuance of any building permit for any lot within this subdivision the property owner shall obtain a Road Approach Permit from the Benton County Public Works Department and install the required temporary construction access

3. No trees, shrubs, weeds, fencing or other obstructions more than 24 inches in height are permitted within Benton County right of way

4. Property owners that install grass, curbing, rock mulch or other landscaping within the County right of way do so at their own risk. The County will not repair or replace damaged landscaping due to construction or maintenance operations

5. No lot in this subdivision shall have direct access to Clodfelter Road

6. Lots 4 and 5 shall not have direct access to 297 PR SE

Community Development Department
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STAFF REPORT TO THE BENTON COUNTY PLANNING COMMISSION

FILE NO:	**SUB 2021-004** **Preliminary Plat of Mammoth Acres**
MEMO DATE:	June 18, 2021
HEARING DATE:	July 13, 2021
APPLICANT:	Rob Duncan dba R3T Ventures, LLC 2410 N 4th Ave Pasco, WA 99301
OWNER:	John Vinyard 1417 Waterford Green Dr Marietta, GA 30068
LOCATION:	The site is located approximately 1,000 feet east of the intersection of Cantera Street and Clodfelter Road in the west 800 feet of the northeast quarter and that portion of the southeast quarter lying north of Clodfelter Road, in Section 23, Township 8 North, Range 28 East, W.M. on parcel number 1-2388-100-0003-000.
PROPERTY SIZE:	Approximately 71.50 acres
AREA TO BE USED:	Approximately 67.18 acres
LAND USE:	Residential
COMP. PLAN:	Rural Remote
ZONING:	Rural Lands Five Acre District
SUGGESTED STAFF RECOMMENDATION:	**Positive recommendation** subject to eight (8) findings of fact and seventeen (17) conditions of approval.

APPLICATION DESCRIPTION

The applicant has submitted a preliminary plat application (PCM 1.4) and map (PCM 1.5) to subdivide approximately 71.5 acres into 12 residential lots. The preliminary plat is known as Mammoth Acres. The land is zoned Rural Lands Five Acre District.

The average lot size in the development is approximately 5.60 acres and the lots are proposed to be served by a new public road, and individual well and septic systems.

The site is located approximately 1,000 feet east of the intersection of Cantera Street and Clodfelter Road in Section 23, Township 8 North, Range 28 East, W.M. on parcel number 1-2388-100-0003-000.

PUBLIC NOTICE

1. A Notice of Application was published in the Prosser Record Bulletin on May 26, 2021 (PCM 1.7).
2. Planning Staff emailed out review packets to technical agencies on May 20, 2021.
3. A Notice of Public Hearing was published in the Prosser Record Bulletin on June 30, 2021 (PCM 1.3)
4. Property owners within 300 feet were mailed notice on June 24, 2021.
5. A SEPA Determination of Mitigated Non-Significance (MDNS) (PCM 1.9) was issued on June 10, 2021.

APPLICABLE STANDARDS/ORDINANCES

1. Comprehensive Plan: Benton County Comprehensive Plan.
2. SEPA: BCC, Title 6, Chapter 6.35 Environmental Policy.
3. Subdivision Code: BCC, Title 9, Subdivision Regulations.
4. Zoning Code: BCC, Title 11, Zoning Regulations.
5. Critical Area Ord.: BCC, Title 15, Critical Areas- BCC 15.02 - 15.14.
6. RCW 58.17: Plats and Subdivisions.
7. Planning Commission/Open Record Hearing:

   Pursuant to BCC 9.05.070, an open record hearing on the proposed subdivision shall be held before the Planning Commission. The Planning Commission shall consider all relevant information, including but not limited to:

   a. The staff report by the Planning Division,
   b. Any written comments or concerns expressed by other reviewing agencies,
   c. Oral and written testimony from persons present at the hearing; and

   If the Planning Commission finds that additional information is needed, the Planning Commission may continue the hearing for up to thirty-five (35) days or such longer period as agreed to by the applicant and direct that the additional information be gathered.

AGENCY COMMENTS

1. Benton County Planning Division: See the suggested findings of fact and conditions of approval for the Planning Division's comments and requirements.
2. Benton County Public Works Department: See comments dated June 7 and June 16, 2021 (PCM 1.15 and 1.18).
3. Benton-Franklin Health District: See comments dated April 28, 2021 and June 9, 2021 (PCM 1.10 and 1.17).
4. Benton PUD: See comments dated May 26, 2021 (PCM 1.13).
5. Benton County Fire Marshal: See comments dated May 21, 2021 (PCM 1.12).
6. Washington State Department of Archeology & Historic Preservation: See comments dated June 3, 2021 (PCM 1.14).
7. Washington State Department of Ecology: See comments dated June 7, 2021 (PCM 1.16).

CRITERIA FOR FINDINGS OF FACT

1. Pursuant to **BCC 9.05.080, Consideration of Preliminary Subdivision**, the Benton County Planning Commission, after conducting an open record hearing and considering all information presented, shall forward a recommendation to the Board of County Commissioners regarding whether the preliminary plat be approved, approved with conditions, or denied as proposed. Prior to making any recommendation, the Planning Commission shall make the following written findings:
    a. That the proposed subdivision conforms to the Benton County Comprehensive Plan, any applicable zoning requirements and other applicable land use controls;
    b. That the County Engineer, or designee, has provided a written representation that the proposed subdivision provides adequate means of access and conformance with the road and drainage requirements of Benton County;
    c. That the proposed subdivision meets the requirements of BCC 9.05;
    d. That the public interest will be served by the proposed division and dedication;
    e. That appropriate provisions are made for the public health, safety, and general welfare, for open spaces, drainage ways, streets or roads, alleys, other public ways, transit stops, potable water, sanitary wastes, parks and recreation, playgrounds, schools, school grounds, and sidewalks;
    f. That the Benton-Franklin Health District has reviewed the proposed subdivision for compliance with its rules and regulations and has not expressed objection to the proposed subdivision; and
    g. If any portion of the proposed subdivision is located within an irrigation district, that the applicant has complied with RCW 58.17.310 as it now exists or is hereafter amended.
2. **RCW 58.17.110 (1)(2)(3)(4). Approval or disapproval of subdivision - factors to be considered- conditions of approval**, including, (4) If water supply is to be provided by a groundwater withdrawal exempt from permitting under RCW 90.44.050, the applicant's compliance with RCW 90.44.050 and with applicable rules adopted pursuant to chapters 90.22 and 90.54 RCW is sufficient in determining appropriate provisions for water supply for a subdivision, dedication, or short subdivision under this chapter.

RECOMMENDATION

Benton County Planning staff will assist the Planning Commission with the determination of findings and conditions for the preliminary plat of Mammoth Acres - File Number SUB 2021-004.

The Benton County Planning Division recommends that the Planning Commission forward a **recommendation of approval** to the Benton County Board of Commissioners for the application SUB 2021-004, with the following suggested findings of fact, conditions of approval, and motion.

SUGGESTED FINDINGS OF FACT:

1. The proposed subdivision (PCM 1.4, application and PCM 1.5, preliminary plat map) conforms to the Benton County Comprehensive Plan, any applicable zoning requirements and other applicable land use controls;
    a. The proposed use is in conformance with the intent of the Comprehensive Plan based on the following facts:
        i. The 71.50 -acre site is bordered on all sides by lands zoned Rural Lands Five Acre District.

ii. The GMA requires counties to include a rural element in their comprehensive plans to permit appropriate land uses that are compatible with the rural character of such lands and provide for a variety of rural densities. This element has been incorporated as a part of the land use element of the County's plan;

iii. The Benton County Comprehensive Plan designates this area as Rural Remote;

iv. Rural Remote is the predominant rural land use in the County. This land is located mostly between the agricultural lands (GMA Agriculture), Rural Transition, and the Urban Growth Areas. Rural Remote land use is intended to enhance and preserve the County's rural character, which includes rural open space, low densities, wildlife habitat, public open space for outdoor recreational activities, and rural home sites on which a limited range of agricultural activities may be conducted. Allowable density in Rural Remote land use is 1Du/5acres.

v. The site is zoned Rural Lands Five Acre District (RL-5). The preliminary plat complies with the minimum lot size and minimum average lot width required for the RL-5 Zoning District;

vi. The smallest lot size is 5.00 acres and the average lot size for this plat is 5.60 acres;

vii. This development is consistent with the required minimum lot size and density standards contained in the Benton County Comprehensive Plan; and

viii. The creation of 12 residential lots in the RL-5 Zoning District furthers the implementation of the Benton County Comprehensive Plan.

b. The proposed plat is consistent with the applicable zoning requirements of the Benton County Code, Title 11, based on the following facts:

i. The property is zoned Rural Lands Five Acre (RL-5). The preliminary plat complies with the minimum lot size and minimum average lot width required for the RL-5 Zoning District.

c. The proposed subdivision does comply with the requirements of the Benton County Code, Title 9, Subdivision Regulations;

i. The proposed subdivision complies with the purpose and preliminary plat requirements included in BCC 9.05 Subdivision - Preliminary Plat.

d. The proposed subdivision complies with the Benton County Critical Area Ordinance BCC Title 15.

i. Upon completion of a review of BCC Title 15 and the Benton County Critical Area Maps, the following critical areas were identified on the subject property: Geologically Hazardous Areas (steep slopes of 15% or greater).

ii. The proposed plat is not located in a special flood hazard area as identified on the Federal Emergency Management Agency Flood Insurance Rate Maps and BCC 3.26.

e. The requirements of the State Environmental Policy Act have been met based on the following:

i. The proposed subdivision has been reviewed under the requirements of BCC Title 6, Chapter 6.35 and the State Environmental Policy Act.

ii. During the SEPA comment period the following comments were received:

1. Washington State Department of Archeology and Historic Preservation (PCM 1.14) recommended a professional archeological survey of the project area be conducted.
2. Benton County Public Works Department required a portion of an existing private road to be dedicated and constructed to County standards to mitigate for traffic impacts generated by the proposed development.
3. Washington State Department of Ecology is requesting the applicant obtain a NPDES Construction Stormwater General Permit.

iii. An MDNS with mitigation/conditions (PCM 1.9) was issued for the project on June 10, 2021.

2. The County Engineer has provided a written representation that the proposed subdivision provides adequate means of access and conformance with the road and drainage requirements of Benton County;
   a. Reference the Benton County Public Works Department comments as it relates to stormwater and drainage easements (PCM 1.15); and
   b. Reference the Benton County Public Works Department comments as it relates to roads and mitigation requirements (PCM 1.15 and PCM 1.18).
3. The proposed subdivision meets the requirements BCC 9 Subdivision Regulations;
   a. The proposed subdivision complies with the purpose and preliminary plat requirements included in BCC 9.05 Subdivision- Preliminary Plat;
4. The public interest will be served by the proposed division and dedication;
   a. The creation of 12 residential lots in the RL-5 Zoning District furthers the implementation of the Benton County Comprehensive Plan; and
   b. Benton County standards are to be complied with including the construction and dedication of the new public road.
5. Appropriate provisions are made for the public health, safety, and general welfare, for open spaces, drainage ways, streets or roads, alleys, other public ways, transit stops, potable water, sanitary wastes, parks and recreation, playgrounds, schools, school grounds, and sidewalks;
   a. Appropriate provisions have been made for the public health and safety based on the following facts:
      i. The applicant has proposed that the preliminary plat be served by individual well and septic systems;
      ii. The Benton Franklin Health District has reviewed the preliminary plat and finds that the proposal generally meets their requirements for plats utilizing onsite sewage disposal systems and onsite single-family water supply; and
   b. Appropriate provisions have been made for open spaces based on the following facts:
      i. The proposed subdivision does not contain land to be designated for open space.
   c. Appropriate provisions have been made for drainage ways based on the following facts:
      i. Harms Engineering, Inc. prepared a preliminary stormwater drainage report for the applicants of Mammoth Acres dated May 6, 2021 (PCM 1.7). The report discusses the provisions made for both offsite and onsite stormwater as it relates to this property and the proposed development;

ii. Reference the Benton County Public Works Department comments as it relates to stormwater and drainage easements (PCM 1.15 and PCM 1.18).

d. Appropriate provisions have been made for streets or roads, alleys, and other public ways based on the following facts:

i. The public interest will be served by the proposed division and dedication as the Benton County Road Department standards are to be complied with including the construction and dedication of new public roads; and

ii. Reference the Benton County Public Works Department comments as it relates to road and mitigation requirements (PCM 1.15 and PCM 1.18).

di. Appropriate provisions have been made for transit stops based on the following facts:

i. Ben Franklin Transit did not comment on transit service for the proposed development. The proposed plat and surrounding area are not served by public transit.

dii. Adequate provisions have been made for potable water supplies based on the following facts:

i. The project is located in the Lower Yakima Watershed, WRIA 37;

ii. Per the Groundwater Permit Exemption (RCW 90.44.050), water for domestic uses does not require a Department of Ecology water right permit if the development contains 14 or less lots. Landowners are eligible to drill an individual well on each lot to provide domestic water.

iii. The County, in accordance with RCW 58.17.110, is required to ensure that appropriate provisions have been made for potable water supplies prior to the approval of a subdivision. The County has completed its review in accordance with this requirement, and through the submittal of well logs and supplemental written record materials, has determined that potable water supplies are both legally and physically/factually available for this proposed development. The potable water supplies identified from the submitted well logs and supplemental written record materials are from both a shallow unconfined aquifer, and a deeper basalt confined aquifer.

iv. The development consists of 12 single family lots and the development is collectively limited to a maximum of 5,000 gallons per day withdrawal. Additionally, all lots that are part of this development are collectively limited to no more than ½ acre of non-commercial lawn or garden for the life of the development if irrigation is to be provided to the lots by the permit exempt well(s) (½ acre total of non-commercial lawn or garden for all lots within the development combined). Based upon an average household use of approximately 350 gallons per day, this development will be less than 5,000 gallons per day.

v. An offsite irrigation source is not proposed for the development's lots.

vi. The Benton-Franklin Health District has reviewed the proposal and find that it generally meets their requirements provided all conditions of approval as listed in the letter dated June 9, 2021 (PCM 1.10 and 1.17) are satisfied.

diii. Adequate provisions have been made for sanitary waste based on the following facts:

i. All lots in the development are proposed to be served by individual septic systems.

h. Adequate provisions have been made for parks, recreation, and playgrounds based on the following facts:

   i. The proposed subdivision does not contain land to be designated for parks or recreation. The Benton County Code does not require park dedications.

i. Appropriate provisions have been made for schools and school grounds and for sidewalks and other planning features that assure safe walking conditions for students who only walk to and from school based on the following facts:

   i. The proposed plat is within the Kennewick School District. The School District did not provide comments on this proposal as to whether there are adequate provisions to assure safe walking conditions for students who walk to and from school or waiting for school buses.

6. The applicable water/sanitary system agency has reviewed the proposed subdivision for compliance with its rules and regulations and has not expressed objection to the proposed subdivision; and

   a. The Benton-Franklin Health District has reviewed the proposed subdivision for compliance with its rules and regulations and has not expressed objection to the proposed subdivision;

   b. Reference the BFHD comments as it relates to this preliminary plat (PCM 1.13).

7. The proposed subdivision is not located within an irrigation district; and

8. RCW 58.17.110 (1)(2)(3)(4). Approval or disapproval of subdivision - factors to be considered-conditions of approval, including, (4) If water supply is to be provided by a groundwater withdrawal exempt from permitting under RCW 90.44.050, the applicant's compliance with RCW 90.44.050 and with applicable rules adopted pursuant to chapters 90.22 and 90.54 RCW is sufficient in determining appropriate provisions for water supply for a subdivision, dedication, or short subdivision under this chapter.

   a. The proposed plat is consistent with RCW 58.17.110 (1)(2)(3)(4). The plat is to be provided potable water from individual groundwater wells.

   b. The development is collectively limited to a maximum withdrawal of 5,000 gallons per day for domestic use from all individual exempt wells within the development for the life of the development. Based upon an average household use of approximately 350 gallons per day according to the Washington State Department of Health, this development's use will be less than 5,000 gallons per day. Additionally, all lots that are part of this development are collectively limited to no more than ½ acre of non-commercial lawn or garden for the life of the development if irrigation is to be provided to the lots by the permit exempt well(s) (½ acre total of non-commercial lawn or garden for all lots within the development combined). However, more restrictive water withdrawal limits may be imposed, above and beyond the 5,000 gallon a day limitation and the ½ acre of non-commercial lawn or garden, as part of the County's Rural Water Supply Program.

SUGGESTED CONDITIONS OF APPROVAL:

1. Applicant shall meet and comply with the requirements of the **Benton County Public Works Department**, including the following:

   a. During the review of the above subdivision Public Works discovered the existence of a parcel of unknown ownership, parcel numbered 123881008888888 where 297 PR SE runs

through the length of that parcel and through 123881000003000, the parcel being subdivided. Local residents being served by 297 PR SE will be negatively impacted by the addition of 12 lots, as their gravel access will likely be used as a short cut. Additional traffic to that portion of 297 PR SE between Clodfelter Road and the proposed road for the development from the development is anticipated. This will impact those who pay to manage that portion of the road and will increase dust emissions. It will also require the road to serve more parcels than currently allowed by County code. Therefore, this portion of the road shall be constructed to county road standard and the underlying 60 feet of property shall be dedicated as county right-of-way the entire length.

b. The developer shall provide a complete set of engineered construction drawings for review and approval by the County and associated utilities. The drawings shall contain all appropriate information listed on the attached Minimum Plan Requirements. Grading plan will include grading to shape any drainage easements to route and fully contain all runoff based upon the 100-year storm within the easement limits. All plans and associated reports shall be prepared by a Professional Engineer licensed to practice in the State of Washington.
c. All construction shall be in accordance with the most current WSDOT Standard Specifications for Road, Bridge and Municipal Construction, applicable Benton County Standard Plans and the requirements of the County Engineer.
d. All roads within this plat shall have a paved width of 24 feet with a minimum 2-foot gravel shoulder. Roadways shall be designed for a minimum 25 mile per hour design speed
e. The pavement return radius at all intersections shall be a minimum of 35 feet.
f. All stormwater from the roadways shall be contained on the plat and shall utilize surface infiltration (ditches, swales, ponds) for detention. The developer shall have an infiltration test performed at each proposed detention area. Tests shall be done with an infiltrometer using the falling head or constant head method. Other methods of infiltration rate determination shall be approved by the County.
g. The developer shall provide a complete storm water runoff report developed in accordance with the Storm water Management Manual for Eastern Washington accosting for all impervious and pervious surfaces draining to the roadside ditches. Design storm shall be a Modified SCS Type IA with a 25-year return frequency.
h. All signage including but not limited to stop signs, speed limit signs and street name signs shall be installed by the developer in accordance with Benton County Standard Plans.
i. All new power, telephone, cable TV and irrigation shall be installed outside of the County right of way in the appropriate easements. Domestic water piping may be installed within the County right of way in accordance with a valid franchise agreement.
j. Survey monuments, with cases and covers per Benton County Standard R-14B, shall be placed at all road intersections, points of curvature, points of tangency, centers of cul-de-sacs, section corners and quarter corners. All monuments shall be set by a Professional Land Surveyor licensed to practice in the state of Washington.
k. Dedicate 60 feet for County right of way extending from the cul-de-sac to the boundary line of lot 6 and 7.
l. Existing multi use access to Clodfelter shall be improved to meet current County standards.

m. Access to parcels 123881012842001, 123881012842003, 123881011085002, 123881011375002, 123881012341002 shall be provided to the new County road, following standard R-3.
   - Public Works is requesting mitigation to the impact this development will have to the existing residents being served by 297 PR SE. The portion of 297 PR SE on parcel 123881008888888 and the portion East of the new proposed road shall be improved to meet current County standards, and 60 feet of right of way shall be dedicated to the County. That portion West of the new proposed road shall remain in its current condition except for the addition of a paved road approach connecting to the new proposed road, following standard R-4.

n. Pave the access from E 297 PR SE to the proposed new road following standard R-4 Urban Local Access; https://www.co.benton.wa.us/files/documents/R-4Standardasof4-25-20172151135250305l9AM.pdf.

o. Please add the following notes to the face of the final plat:
   - Benton County is not responsible for the maintenance or upkeep of any storm water retention facility or drainage easements. All such maintenance and upkeep are the responsibility of the underlying property owner.
   - Prior to the construction of any driveway or the issuance of any building permit for any lot within this subdivision the property owner shall obtain a Road Approach Permit from the Benton County Public Works Department and install the required temporary construction access.
   - No trees, shrubs, weeds, fencing or other obstructions more than 24 inches in height are permitted within Benton County right of way.
   - Property owners that install grass, curbing, rock mulch or other landscaping within the County right of way do so at their own risk. The County will not repair or replace damaged landscaping due to construction or maintenance operations.
   - No lot in this subdivision shall have direct access to Clodfelter Road.
   - Lots 4 and 5 shall not have direct access to 297 PR SE.

p. For more information please contact Cristina Woods at 509-786-5611 or Cristina.Woods@co.benton.wa.us.

2. Applicant shall meet and comply with the requirements of the **Benton Franklin Health District**.

   a. Please add the following note to the plat map:
      - “This plat appears to have suitable conditions for the use of on-site sewage disposal systems. However, because of the nature of the testing methods used, we have no way of determining whether each lot can comply with Benton-Franklin Board of Health Rules and Regulation at the time of permit issuance. Further be advised this department’s approval of any lot within this plat for the use of on-site sewage disposal systems may be contingent upon that lot passing additional soil inspections, percolation tests, and/or other requirements at a later date.”

3. Applicant shall meet and comply with the requirements of the **Benton PUD**, including the following:

a. A 10.00-foot utility easement needs to be provided along all roads, between each parcel and where the existing overhead power runs east to west in the access road.

b. BPUD will need to be informed of any need for three phase power for well pumps prior to power layout.

c. For more information please contact Tina Glines at 509-582-1241.

4. Applicant shall meet and comply with the requirements of the **Benton County Fire Marshal** including the following:

   a. If driveways are 200' (feet) or more, the applicant or new lot owners must comply with BCC 3.18.045 for Driveways and Private Roads.

   b. Please contact the Benton County Fire Marshal, Clark Posey, at (509) 735-3500 or Clark.Posey@co.benton.wa.us for more information.

5. Applicant shall meet and comply with the requirements of the **Department of Archeology and Historic Preservation**, including the following:

   a. Thank you for contacting the Washington State Historic Preservation Officer (SHPO) and Department of Archaeology and Historic Preservation (DAHP) and providing documentation regarding the above referenced project. Our statewide predictive model indicates that there is a moderate-to-low probability of encountering cultural resources within the proposed project area. However, very few cultural resource studies have been performed in this area, and archaeological sites have been found on many landforms in Benton County. Further, the scale of the proposed ground disturbing actions would destroy any archaeological resources present. Identification during construction is not a recommended detection method because inadvertent discoveries often result in costly construction delays and damage to the resource. Therefore, we recommend a professional archaeological survey of the project area be conducted prior to ground disturbing activities. We also recommend consultation with the concerned Tribes' cultural committees and staff regarding cultural resource issues.

   b. These comments are based on the information available at the time of this review and on behalf of the SHPO in conformance with Washington State law. Should additional information become available, our assessment may be revised.

   c. Thank you for the opportunity to comment on this project and we look forward to receiving the survey report. Please ensure that the DAHP Project Number (a.k.a. Project Tracking Code) is shared with any hired cultural resource consultants and is attached to any communications or submitted reports.

   d. For more information please contact Sydney Hanson, Transportation Archaeologist at (360) 586-3082 or Sydney.Hanson@dahp.wa.gov.

6. Applicant shall meet and comply with the requirements of the **Department of Ecology**, including the following:

   a. If the project anticipates disturbing ground with the potential for stormwater discharge off-site, the NPDES Construction Stormwater General Permit is recommended. This permit requires that the SEPA checklist fully disclose anticipated activities including building, road construction and utility placements. Obtaining a permit may take 38-60 days.

The permit requires that a Stormwater Pollution Prevention Plan (Erosion Sediment Control Plan) shall be prepared and implemented for all permitted construction sites. These control measures must be able to prevent soil from being carried into surface water and storm drains by stormwater runoff. Permit coverage and erosion control measures must be in place prior to any clearing, grading, or construction.

In the event that an unpermitted Stormwater discharge does occur off-site, it is a violation of Chapter 90.48 RCW, Water Pollution Control and is subject to enforcement action.

b. More information on the stormwater program may be found on Ecology's stormwater website at: http://www.ecy.wa.gov/programs/wq/stormwater/construction.

c. Please submit an application or contact Lloyd Stevens Jr. at the Dept. of Ecology, 509-574-3991 or email lloyd.stevensjr@ecy.wa.gov, with questions about this permit.

d. In Washington State, prospective water users must obtain authorization from the Department of Ecology before diverting surface water or withdrawing ground water, with one exception. Ground water withdrawals of up to 5,000 gallons per day used for single or group domestic supply, up to 5,000 gallons per day used for industrial purposes, stock watering, and for the irrigation of up to one-half acre of non-commercial lawn and garden are exempt from the permitting process. Water use under the RCW 90.44.050 exemption establishes a water right that is subject to the same privileges, restrictions, laws and regulations as a water right permit or certificate obtained directly from Ecology.

e. If you have any questions or would like to respond to these Water Resources comments, please contact Christopher Kossik at (509) 454-7872 or email at christopher.kossik@ecy.wa.gov.

7. Applicant shall meet and comply with the requirements of the **Benton County Planning Division**, including the following:

a. The applicant shall meet and comply with the SEPA Determination for this application, including the MDNS with mitigation/conditions issued by the Planning Division on March 25, 2021 (PCM 1.11).
   - The Washington State Department of Archeology and Historic Preservation recommendations as outlined in the letter dated June 3, 2021 (PCM 1.14);
   - The Benton County Public Works Department's road requirements as outlined in their letters dated June 7, 2021 and June 16, 2021 (PCM 1.15 and 1.18); and
   - The Washington State Department of Ecology recommendations as outlined in their letter dated June 7, 2021 (PCM 1.16).

b. Per BCC 9.09.030(p) Development - Estate Fencing; double frontage lots are discouraged. To mitigate for this, an estate type fence or a 3-rail traditional ranch type fence shall be placed along the following locations:
   - The south parcel line of Lots 1, 12 and the east parcel line of Lot 11.
   - The fence shall be constructed in compliance with Benton County's road sightline standards for intersections.

c. Please submit three possible names for each new road, containing between 3-12 characters. The possible names should not: contain non-letter characters, exceed two words in length, contain directional names (north, south), and should avoid similar sounding names

to existing roads in the County and cities. Benton County GIS will review the proposed names for consistency with the road naming guidelines, cross check the proposed names against existing roads in Benton County, and will select one name for each road.

- Please note the creation of a new County road may require existing addresses adjacent to the subject property to be changed to reflect the new road name.

d. Indicate any areas within the plat having a slope of fifteen (15) percent or greater.

e. Please remove references to the adjacent parcel owner names and parcel numbers on the final plat map.

f. Short plat 1375 shows a drainage easement which appears to extend onto the subject property, please reference this drainage on the plat map if applicable.

g. Please include the following signature blocks on the final plat:

- Owner/notary
- Benton County Engineer
- Chairman of the Benton County Board of Commissioners
- Chairman of the Benton County Planning Commission
- Benton-Franklin Health District
- Benton PUD
- Benton County Auditor
- Benton County Treasurer

h. The following notes shall be placed on the final plat:

- "During construction on each property, all construction debris shall be maintained on-site and properly disposed of. Dust control measures including an adequate water supply shall be provided".
- "The utility easements shown hereon are hereby granted for the use, access and maintenance by the short-platted property's current utility provider. Said utility easements are for the use, access and maintenance of electric power, telephone, cable and any other defined utilities to and or through said tract."
- "Prior to the granting of a building or factory assembled (FAS) permit for each lot by the County, the applicant for a building or FAS permit must comply with RCW 90.44.050, as currently existing and hereafter amended, regarding public ground water. The applicant must demonstrate that potable water is legally available by presenting (A) evidence of a valid water right permit from the Washington State Department of Ecology for the proposed wells for each lot; (B) a water well report filed and received by the Washington State Department of Ecology for an exempted well that complies with the 5,000 gallon per day exemption described in RCW 90.44.050, as currently existing and hereafter amended; or (C) a written approval of the Washington State Department of Health that a group A or group B public water supply system has been installed and is available for providing potable water to the lot."
- "All lots within this development are collectively limited to a maximum withdrawal of 5,000 gallons per day for domestic use from all individual exempt wells for the life of

the development. Additionally, all lots are collectively limited to no more than ½ acre of non-commercial lawn or garden for the life of the development if irrigation is to be provided to the lots by the permit exempt well(s) (½ acre of total of non-commercial lawn or garden for all lots within the development cumulatively, not ½ acre per lot). However, more restrictive water withdrawal limits may be imposed, above and beyond the 5,000 gallon a day limitation and the ½ acre of non-commercial lawn or garden, as part of the County's Rural Water Supply Program."

- "Address numbers [noted in brackets] are subject to change until the exact location of access onto each lot is determined."
- "Per BCC 11.11.090, as currently existing and hereafter amended, all structures must be at least 25 feet back from all private road easements."
- "Benton County is not responsible for the construction and/or maintenance of private road easements."
- "The dedicated right-of-way located on Lots 6 and 7 may be extended to serve lots outside of this plat."
- "It is expressly declared and understood that Benton County has no duty, obligation or responsibility for the construction, upkeep, maintenance or repair of storm drainage facilities or drainage easements located outside of the County road right-of-way."
- "Portions of this plat are located within a critical resource area classified as geologically hazardous (steep slopes greater than 15%). Please contact the Benton County Planning Division for more information."
- "This property lies within 500 feet of a protected mineral resource site as designated on the on Mineral Resource Lands Map. A variety of commercial activities may occur that are not compatible with residential development. Please contact the Benton County Planning Division for further information."
- "This short plat is not located within an irrigation district."

8. Preliminary plat approval shall be effective for 5 (five) years from the date of Board of County Commissioner approval. Exceptions shall comply and approved subject to the provisions of BCC 9.05.110 (e) as currently existing or hereafter amended.

9. Any amendments to an approved preliminary plat must be completed in accordance with BCC 9.05.140 as currently existing or hereafter amended.

10. Prior to the final plat being reviewed for final approval, the requirements of the Benton County Planning Division, Benton County Fire Marshal, Benton County Engineer, Benton Franklin Health District, and other commenting agencies and conditions shall be met and complied with.

11. Final Plat applications shall be submitted to the Planning Division. An applicant shall submit a final plat application that follows BCC 9.07 - Final Plat standards and requirements, as currently existing or hereafter amended:

12. All lots in the final plat shall meet the design standards for final plat approval as specified in Benton County Code 9.09 - Design and Improvements, as currently existing or hereafter amended, and meet all of the zoning requirements as specified in Benton County Code, Title 11 - Zoning, as currently existing or hereafter amended.

13. The location and size of all irrigation and utility easements necessary for electric power, telephone service, water, sewer and cable TV are to be coordinated with the proper utilities and/or reviewing

agencies and shown on the final plat. The developer will need to open the utility trenches, including road crossings, based on individual utility requirements and specifications.

14. Address numbers shall be coordinated with Benton County GIS and placed on the final plat. Addresses [noted in brackets] are subject to change until the exact location of the dwelling and access onto the plat is determined.

15. The applicant shall coordinate with the Post Office regarding centralized box unit (CBU) locations for the development, if necessary.

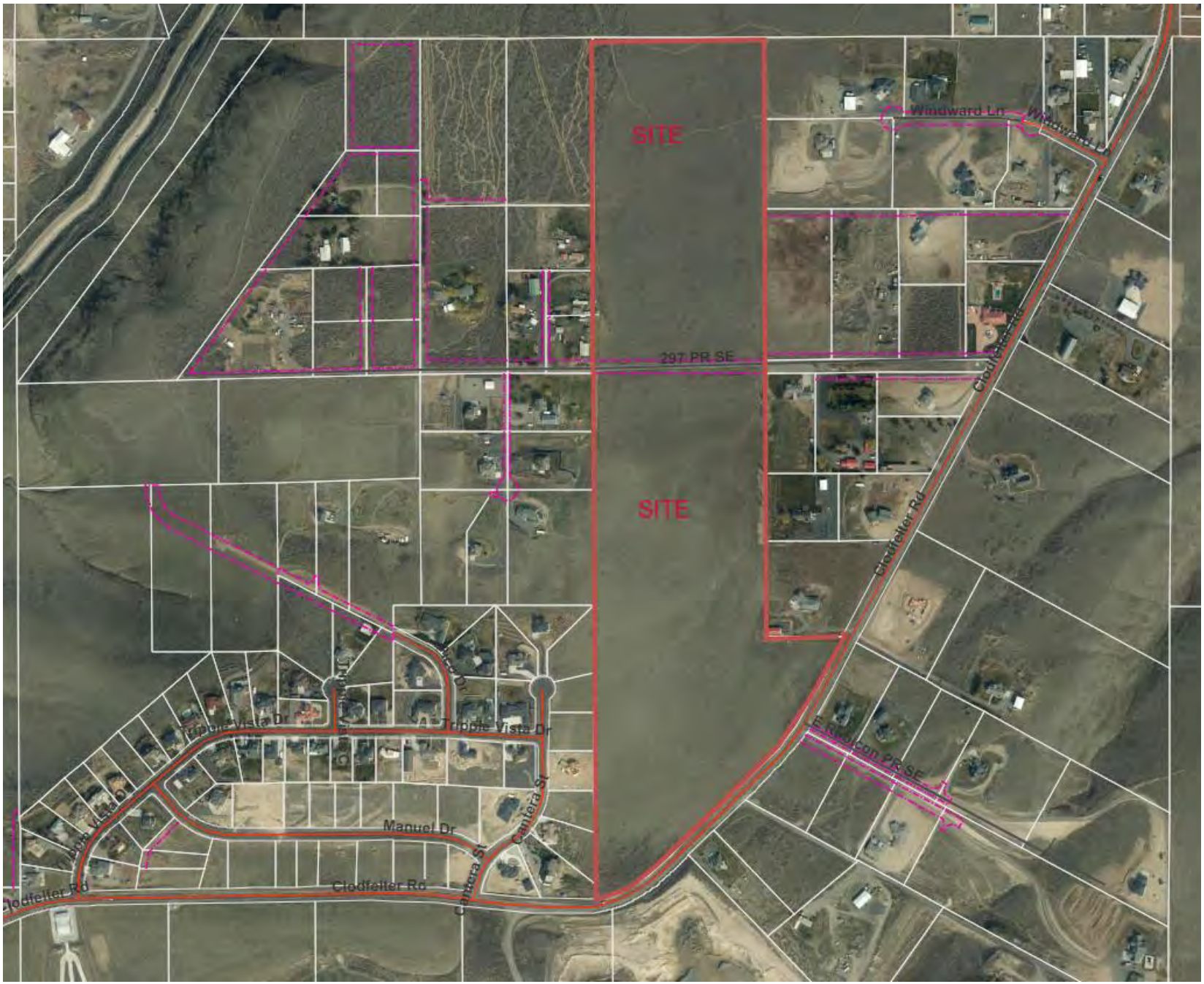
16. All of the statements that are required to be on the notes of the plat shall be either: 1) recorded as a restrictive covenant on each applicable parcel with the County Auditor, or 2) described in detail in the developer's covenants that are recorded and provided to each lot owner, prospective landowner, and the Planning Division at the time of final plat approval and recording.

17. That the preliminary plat is modified in all necessary respects so that the final plat will reflect the requirements of approval. If the final plat will be in conflict with any of the conditions of approval as adopted by the Planning Commission as a result of the modifications, then the final plat must be reviewed by the Planning Commission at a public meeting for approval prior to sending the final plat to the Board of County Commissioners.

SUGGESTED MOTION:

The Planning Commission forwards a **recommendation of approval** to the Benton County Board of Commissioners for Application SUB 2021-004/EA 2021-014, subject to the eight (8) findings of fact and seventeen (17) conditions of approval as stated in the staff memo (PCM 1.1) dated June 18, 2021, which includes the preliminary plat approval for 12 residential lots and that the Chairman, in conjunction with the Secretary of the Planning Commission, prepare and adopt written findings and conclusions reflecting the commission's recommendation for approval that articulate and are consistent with the findings, conclusions and recommendations made by the Planning Commission tonight.

SUB 2021-004 and EA 2021-014 Vicinity Map
Mammoth Acres Preliminary Plat - May 20, 2021

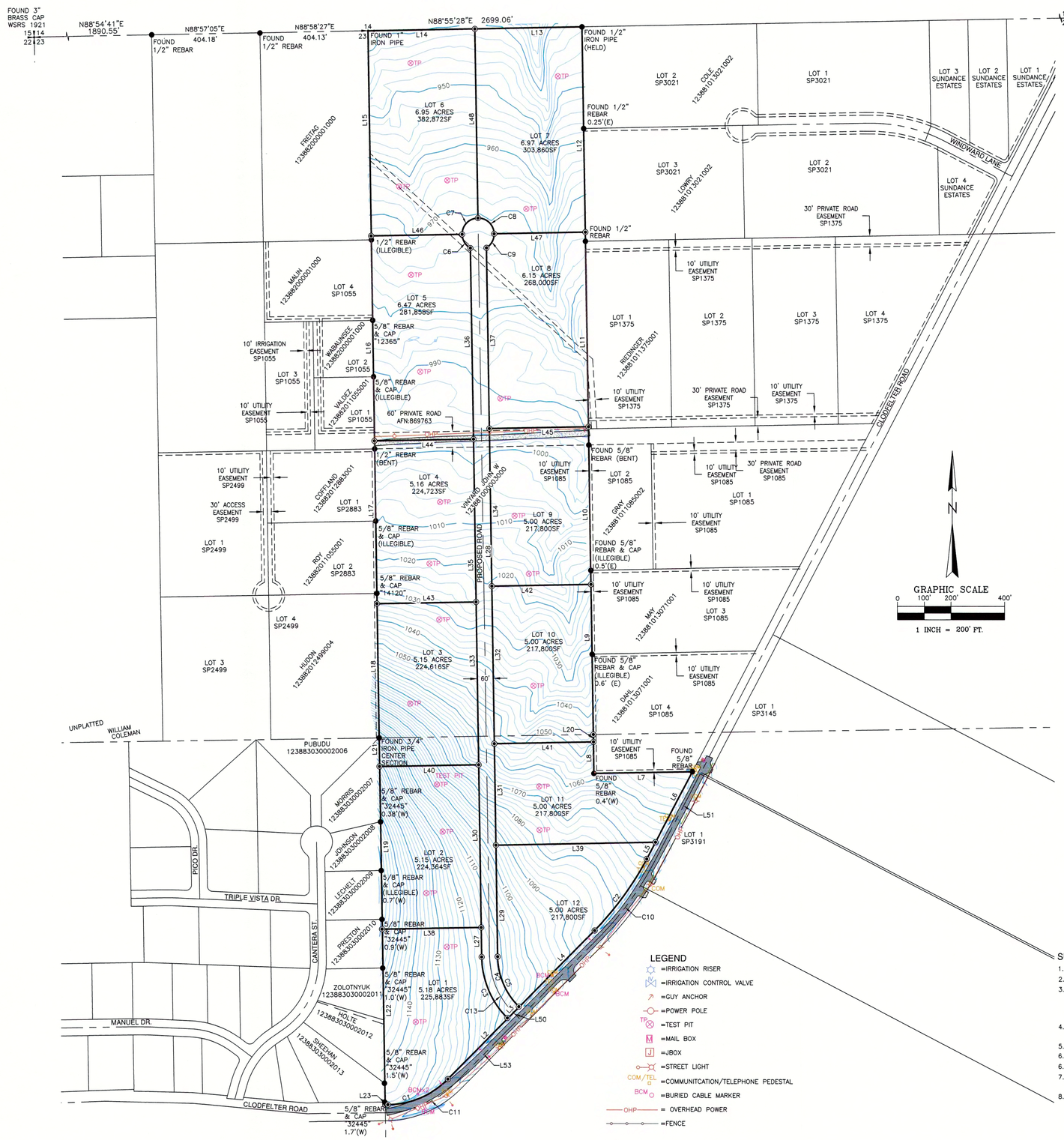


PCM 1.5

PRELIMINARY PLAT FOR MAMMOTH ACRES

PORTION OF THE EAST 1/2 OF SECTION 23, TOWNSHIP 8 NORTH, RANGE 28 EAST, WILLAMETTE MERIDIAN, BENTON COUNTY, WASHINGTON

VICINITY MAP



DESCRIPTION

THE WEST 800 FEET OF THE NORTHEAST QUARTER AND THAT PORTION OF THE SOUTHEAST QUARTER LYING NORTH OF CLODFELTER ROAD, EXCEPT THAT PORTION OF THE NORTH 145 FEET THEREOF LYING EAST OF THE WEST 800 FEET OF SAID SOUTHEAST QUARTER, ALL IN SECTION 23, TOWNSHIP 8 NORTH, 28 EAST, W.M., BENTON COUNTY, WASHINGTON. (TITLE)

THE PORTION OF SECTION 23, TOWNSHIP 8, RANGE 28 DEFINED AS FOLLOWS: THE WEST 800.00 FEET OF THE NORTHEAST QUARTER, SUBJECT TO FUTURE ROAD EASEMENTS. AND THE PORTION OF THE SOUTHEAST QUARTER LYING NORTH OF CLODFELTER ROAD, EXCEPT THAT PORTION OF THE NORTH 145.00 FEET THEREOF LYING EAST OF THE WEST 800.00 FEET OF SAID SOUTHEAST QUARTER. (SPATELIST BC ASSESSOR)

Line Table		
Line #	Length	Direction
L2	318.52	S44°33'54"W
L3	60.00	S44°33'54"W
L4	401.17	S44°33'54"W
L5	70.44	N27°33'27"E
L6	296.99	N27°33'27"E
L7	367.86	S89°03'54"W
L8	117.38	S01°01'55"E
L9	560.56	N00°57'40"W
L10	588.02	N00°57'40"W
L11	726.31	N00°57'40"W
L12	765.72	N00°57'40"W
L13	2699.09	N88°55'28"E
L14	2699.09	N88°55'28"E
L15	765.12	N00°57'40"W
L16	764.99	N00°57'40"W
L17	607.47	N00°57'40"W

Line Table		
Line #	Length	Direction
L18	501.05	N00°57'40"W
L19	607.43	S01°01'55"E
L20	27.60	S01°01'55"E
L21	106.39	S01°01'55"E
L22	645.84	S01°01'55"E
L23	10.01	S01°01'55"E
L27	110.34	S00°58'12"E
L28	2697.78	S00°58'12"E
L29	416.47	S00°58'12"E
L30	607.43	S00°58'12"E
L31	378.79	S00°58'12"E
L32	588.16	S00°58'12"E
L33	607.45	S00°58'12"E
L34	588.01	S00°58'12"E
L35	607.47	S00°58'12"E
L36	713.14	S00°58'12"E

Line Table		
Line #	Length	Direction
L37	674.39	S00°58'12"E
L38	368.96	S88°58'03"W
L39	596.07	S88°58'03"W
L40	369.62	S88°58'03"W
L41	369.92	S88°58'03"W
L42	369.98	S88°58'03"W
L43	369.66	N88°58'03"E
L44	370.17	S88°58'03"W
L45	370.07	S88°58'03"W
L46	340.16	S88°58'03"W
L47	340.18	S88°58'03"W
L48	705.36	N00°58'12"W
L50	32.70	S45°03'25"E
L51	3519.40	N27°33'27"E
L53	771.44	S44°33'54"W

Curve Table					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD DISTANCE
C1	250.08	320.00	44°46'36"	S66°57'13"W	243.77
C2	331.21	1115.80	17°00'27"	N36°03'41"E	330.00
C3	253.90	329.97	44°05'14"	S23°00'49"E	247.68
C4	230.82	299.97	44°05'14"	S23°00'49"E	225.16
C5	207.73	269.97	44°05'14"	S23°00'49"E	202.65
C6	62.69	59.99	59°52'12"	S31°02'05"E	59.88
C7	94.37	59.99	90°07'48"	S43°57'55"W	84.94
C8	94.24	59.99	90°00'16"	N45°58'03"W	84.85
C9	62.82	59.99	59°59'44"	N29°01'57"E	59.99
C10	340.12	1145.80	17°00'27"	N36°03'41"E	338.87
C11	289.16	370.00	44°46'36"	S66°57'13"W	281.85
C12	230.84	300.00	44°05'14"	S22°08'06"E	225.19
C13	230.82	299.97	44°05'14"	S23°00'49"E	225.16

SURVEYOR'S NOTES

1. DATE OF SURVEY/MONUMENTS VISITED: APRIL 2021.
2. BASIS OF BEARING: NAD83(93) WASHINGTON STATE PLANE COORDINATE SYSTEM, SOUTH ZONE.
3. UNITS OF MEASURE: US SURVEY FEET GRID DISTANCES. MULTIPLY GRID DISTANCES BY A COMBINED SCALE FACTOR OF 1.000104457 TO ACHIEVE GROUND DISTANCES. REFERENCE SURVEY AND LOT AREAS ARE GROUND DISTANCES. MULTIPLY GROUND DISTANCES BY A COMBINED SCALE FACTOR OF 0.999895554 TO ACHIEVE SURVEYED GRID DISTANCES.
4. EQUIPMENT/PROCEDURES: TOPCON GR3 GNSS, RTK METHOD. LINEAR CLOSURES MEET OR EXCEED STANDARDS CONTAINED IN WAC 332-130-090.
5. ● FOUND AS NOTED.
6. ◉ SET 5/8" REBAR & CAP STAMPED "PERMIT 54534"
6. REFERENCE SURVEY: RECORD OF SURVEY NO. 4720, AUDITOR'S FILE NO. 2016-007807.
7. CONTOURS: 2' CONTOURS DERIVED FROM GROUND SURVEY WITH AN ACCURACY OF 1/10TH THE CONTOUR INTERVALS.
8. THE PURPOSE OF THIS TOPOGRAPHIC SURVEY IS FOR A PRELIMINARY PLAT APPLICATION.

PRE-PLAT NOTES

1. OWNER: JOHN W. VINYARD
2. ADDRESS: UNDETERMINED WA (MAILING: 1417 WATERFORD GREEN DR MARIETTA, GA 30068-2910)
3. PARCEL NO. 123881000003000
4. DEVELOPING AREA: 67.30 ACRES (ASSESSOR) 71.50 ACRES (SURVEY)
5. ZONING: RL-5
6. ACREAGE PROPOSED LOT SIZE: ~5.00 ACRES
7. EXISTING USE: VACANT
8. PROPOSED USE: RESIDENTIAL

DEVELOPER:

ROB DUNCAN
R3T VENTURES
2410 N 4TH AVE
PASCO WA 99301
DIRECT: (403)795-5101
EMAIL: RRDUNCAN@NEWWAYGROUP.CA

ENGINEER:

CHRISTY BATAYOLA, PE
PRESIDENT
632 W SYLVESTER STREET
PASCO WA 99301
(O) 509.547.2679
(M) 509.308.0805
CHRISTINE@HARMSENGINEERING.COM
HARMSENGINEERING.COM

SURVEYOR'S CERTIFICATION

I, ASHLEY D. GARZA, A REGISTERED LAND SURVEYOR, HEREBY CERTIFY THAT THE PLAT AS SHOWN HEREON IS BASED ON AN ACTUAL FIELD SURVEY OF THE LAND DESCRIBED AND THAT ALL CORNERS AND DIMENSIONS ARE CORRECTLY SHOWN AND THAT SAID PLAT IS STAKED ON THE GROUND AS INDICATED HEREON.

PRELIMINARY

ASHLEY D. GARZA DATE
CERTIFICATE NO. 54534

ASHLEY D. GARZA STATE OF WASHINGTON 54534 REGISTERED PROFESSIONAL LAND SURVEYOR PRELIMINARY

PERMIT SURVEYING INC
2245 Robertson Drive
Richland, Washington 99354
OFFICE 509-375-4123
FAX 509-371-0999

PROJECT NO.	20157
DRAWN BY:	SDA
CHECKED BY:	ADG
SCALE:	1" = 200'
	04/25/21
SHEET	1 OF 1

R3T VENTURES

PRELIMINARY PLAT AT CLODFELTER ROAD KENNEWICK, WASHINGTON

Community Development Department
Prosser Office: 620 Market Street, 1st Floor
Kennewick Office: 102206 East Wiser Parkway
www.co.benton.wa.us

Planning Division
(509) 786-5612
P.O. Box 910, Prosser, WA 99350
planning.department@co.benton.wa.us

PCM 1.3

NOTICE OF OPEN RECORD HEARING

NOTICE IS GIVEN that the following application will be considered by the Benton County Planning Commission at a public hearing on Tuesday, July 13, 2021, at 6 p.m. via in person and virtual meeting format in the Meeting Room on the first floor of the Courthouse, 620 Market Street, Prosser WA. The entry to the meeting room is located off of Main Street on the East side of the Courthouse. (see below for more information).

SUB 2021-004 - for the preliminary plat of Mammoth Acres, a subdivision of 71.5 acres into 12 lots with an average lot size of 5.60 acres located approximately 1,000 feet east of the intersection of Cantera Street and Clodfelter Road in Section 23, Township 8 North, Range 28 East, W.M. on parcel number 1-2388-100-0003-000 - Project Applicant: Ron Duncan, Pasco WA 99301

NOTICE IS FURTHER GIVEN that the proposed Subdivision have been reviewed under the requirements of the State Environmental Policy Act and a Mitigated Determination of Non-Significance (DNS) was issued on June 10, 2021. Accordingly, an Environmental Impact Statement was not required on the proposal. Any comments regarding this determination and the environmental impacts of the proposal can be made at the Planning Commission Hearing or in writing to the Benton County Planning Department by 3 p.m. on July 12, 2021.

In an effort to continue to provide public access to the Planning Commission meetings, Benton County will be providing both in person, telephonic and video access for the public to view and provide testimony at the Planning Commission meetings. A map to the meeting room will be posted on our website at the link below. If you choose to join the meeting telephonically, we ask that you please limit background noise or mute your line to prevent any unnecessary interruption to the meeting. To find information on virtual attendance options, including streaming video, WebEx video conferencing and telephone, please visit www.tinyurl.com/BCPublicNotice.

If you wish to provide comments via WebEx on the proposal before the Planning Commission, we ask that you please fill out our online form (found at https://tinyurl.com/testifyform) and submit your request to our office. You must submit a request form to participate for each hearing that you wish to attend. If you prefer to make the request by phone, please call our office at 786-5612 and we can add you to the list for providing testimony. At the meeting the names of those wishing to testify will be called out and at that time you will be able to present your comments/concerns regarding the specific agenda item.

At this hearing, the Planning Commission may recommend approval, conditional approval, or disapproval of the applications to the Benton County Board of Commissioners. All parties concerned may present any support or objections for the application per the phone in instructions above. Information concerning the applications can be obtained at the Benton County Planning Department, by calling 736-3086 (Tri-Cities) or 786-5612 (Prosser).

Dated at Prosser, Washington on this 23rd day of June 2021.

Martin Sheeran, Chairman
BENTON COUNTY PLANNING COMMISSION

Greg Wendt, Director
COMMUNITY DEVELOPMENT DEPT.

PUBLISH ON: June 30, 2021

BENTON COUNTY PRELIMINARY PLAT APPLICATION

File No. SUB 2021-004

RECEIVED
MAY 7 2021
Benton Co. Planning Dept.

Subdivision Name: Mammoth Acres

1. Applicant Name: Rob Duncan
   Applicant Address: 2410 N 4th Ave, Pasco Wa, 99301
   Telephone number: Home Work 4037955101

2. If you wish to be contacted via email, please list your email address:
   rrduncan@newwaygroup.ca

3. Legal Owners Name: John W Vinyard
   Legal Owners Address: 1417 Waterford Green Dr. Marietta, GA 30068
   Telephone number: Home 7706425433 Work 7703293791

4. Name and address of land surveyor Permit Surveying Inc - Ashley Garza
   2245 Robertson Dr. Richland Washington 99354
   Telephone 509 901 8753

5. Name and address of engineer Harms Engineering - Christy Harms
   1632 W Sylvester St, Pasco, Wa 99301
   Telephone 509 547 2679

6. Parcel number and Legal description of property included in the preliminary plat:
   1-2388-100-0003-000
   Please see plat map for Legal description

7. **Land Use Information:**
   a. Total area involved 71.5
   b. Total number of lots 12
   c. Smallest lot area 5.0 acres
   d. Average lot area 5.6 acres

e. Acreage in parks 0

f. Length of public streets 2960

g. Total acreage of public streets 4.2 acres

8. Proposed annexation plans None

9. Plat will be served by:
Water: Individual Wells X City Water _____

Name of City Provider NA

Private Water System _____ Name & Address of Private System _____

_____

Sewer: Septic Tank X City Sewer _____ Private System X

Power: P.U.D. X R.E.A. _____

Telephone: Frontier Telephone _____ Sprint Telephone _____

Natural Gas: Yes _____ No X Name of Utility _____

Cable T.V. Yes _____ No X Name of Utility _____

Irrigation: Yes _____ No X Name of Utility _____

Private Irrigation Lines: Yes X No _____

10. School District Kennewick

11. Fire District Kennewick

12. Any other comments or information that is significant _____

_____

_____

13. Will this plat be finalized in phases? Yes _____ No X If so, how many? 1 Phase

14. Comprehensive Plan Designation _____

15. Zoning Designation RL - 5

IF YOU HAVE ANY ADDITIONAL COMMENTS PLEASE ATTACH THEM ON A SEPARATE SHEET OF PAPER.

I also certify that the information given in this application is true and complete to the best of my knowledge.

Signature Block for individuals only.

Applicant's Signature	Print Name	Date
Signature of Legal Owners	John W Vinyard V	4/15/21
	Print Name	Date
Signature of Person with additional ownership interest	Print Name	Date

ALL persons with an ownership interest in the property on which the land use action is proposed must sign the application other than interests exclusively limited to ownership of the parcel's mineral rights.

If the applicant or owner is a corporation/partnership/LLC etc. please use the following signature block. Please copy this page if more than one corporation/partnership/LLC signature is required.

Applicant or legal owner: R3T VENTURES LLC

By: ROB DUNCAN (print name), PRESIDENT (Title)

Signature: _____ (Signature), _____ (Title)

The above signed officer of R3T VENTURES LLC (name of entity) warrants and represents that all necessary legal and corporate actions have been duly undertaken to permit ROB DUNCAN to submit this application and that the above signed officer has been duly authorized and instructed to execute this application.

Community Development Department
Prosser Office: 620 Market Street, 1st Floor
Kennewick Office: 102206 East Wiser Parkway
www.co.benton.wa.us

Planning Division
(509) 786-5612
P.O. Box 910, Prosser, WA 99350
planning.department@co.benton.wa.us

PCM 1.7

Notice of Application - Optional DNS Process

Benton County has received a preliminary plat application and environmental checklist for the following project:

Date of permit application: **May 7, 2021**
Date of determination of completeness: **May 20, 2021**
Date of Notice of Application: **May 20, 2021**
Comment due date: **14 days from publication of this notice**
Date of Notice of Application Publication: **May 26, 2021**

Agency Contact: Michelle Cooke, Benton County Assistant Planning Manager
michelle.cooke@co.benton.wa.us, (509) 786-5612

Agency File Number(s): SUB 2021-004 and EA 2021-014

Project Description: The preliminary plat of Mammoth Acres for the subdivision of 71.5 acres into 12 lots with an average lot size of 5.60 acres.

Project Location: The site is located approximately 1,000 feet east of the intersection of Cantera Street and Clodfelter Road in the west 800 feet of the northeast quarter and that portion of the southeast quarter lying north of Clodfelter Road, in Section 23, Township 8 North, Range 28 East, W.M. on parcel number 1-2388-100-0003-000.

Project Applicant: Rob Duncan, 2410 N. 4th, Pasco, WA 99301

SEPA Environmental Review: The Benton County Planning Division has reviewed the proposed project for probable adverse environmental impacts and expects to issue a Determination of Non-Significance (DNS) or Mitigated Determination of Non-Significance (MDNS). The proposal may include mitigation measures under applicable codes, and the project review process may incorporate or require mitigation measures regardless of whether an EIS is prepared. The optional DNS process in WAC 197-11-355 is being used. This may be your only opportunity to comment on the environmental impacts of the proposed project.

Agencies, tribes, and the public are encouraged to review and comment on the proposed project and its probable environmental impacts. Comments must be submitted 14 days from date of publication to the Benton County Planning Division, P.O. Box 910, Prosser, WA 99350. Any information submitted to Benton County is subject to the public records disclosure law for the State of Washington (RCW Chapter 42.17) and all other applicable law that may require the release of the documents to the public.

Preliminary Development Regulations and Existing Environmental Documents: To evaluate the impacts of the proposed project, the following may be used for mitigation, consistency, and the development of findings and conclusions:

Benton County Code, including BCC Title 15 CAO, BCC Title 6.35 SEPA, Comprehensive Plan, BCC Title 9-Subdivision Regulations, BCC Title 11-Zoning Regulations, Department of Ecology, and the SEPA Environmental Checklist, signed May 6, 2021.

Other required agency evaluations, approvals, permits, and mitigation as necessary.

Required Permits:
Benton County Building Division Grading Permit and other forms, reports, or approvals as necessary.

Required Studies:
Unknown at this time.

This project does require an open record hearing before the Planning Commission and a closed record hearing before the Board of County Commissioners. A copy of the subsequent threshold determination and any other information concerning this action may be obtained by contacting the Benton County Planning Division at P.O. Box 910, Prosser, WA, (509) 786-5612.

Dated at Prosser Washington on this 20th day of May 2021.

Michelle Cooke, Assistant Planning Manager
Benton County Planning Division

Community Development Department
Prosser Office: 620 Market Street, 1st Floor
Kennewick Office: 102206 East Wiser Parkway
www.co.benton.wa.us

Planning Division
(509) 786-5612
P.O. Box 910, Prosser, WA 99350
planning.department@co.benton.wa.us

PCM 1.8

MITIGATED DETERMINATION OF NON-SIGNIFICANCE

Proponent:
R3T Ventures, LLC
Rob Duncan
2410 N 4th Ave
Pasco, WA 99301

File No. EA 2021-014

Project Description: The applicant is proposing a preliminary plat with 12 residential lots on 71.50 acres with an average lot size of 5.60 acres.

Project Location: The site is located approximately 1,000 feet east of the intersection of Cantera Street and Clodfelter Road in the west 800 feet of the northeast quarter and that portion of the southeast quarter lying north of Clodfelter Road, in Section 23, Township 8 North, Range 28 East, W.M. on parcel number 1-2388-100-0003-000.

Jurisdiction: Benton County, Washington.

Lead Agency: Benton County Planning Division.

Threshold Determination: The lead agency for this proposal has determined that it will not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21C.030(2)(3), provided that the following measures are taken to mitigate potential adverse impacts. Substantive authority to require mitigation is derived from WAC 197-11-660 and Benton County Code, Chapter 6.35.120. The decision was made after review of a completed environmental checklist, comments received from various agencies and other information on file with the lead agency. This information is available to the public on request.

This MDNS is issued under WAC 197-11-355; no additional comments are being requested.

Conditions/Mitigating Measures: See Attached.

Appeals: You may appeal this determination to the Benton County Planning Division at Post Office Box 910, Prosser, WA 99350, no later than June 24, 2021 by written notice. The fee for a threshold determination appeal is $700.00. An appeal of the determination must be made in writing to the Benton County Planning Division and a public hearing will be scheduled and the appellant will be notified of the date, time, and place. You should be prepared to make specific factual objections. Contact the Planning Division to read or ask about the procedures for SEPA appeals.

SEPA Responsible Official: Greg Wendt
Position/Title: Planning Manager
Address: P.O. Box 910, Prosser WA 99350

Date**: June 10, 2021**

Greg Wendt, Planning Manager

DISTRIBUTION:
Benton County Building Division
Department of Natural Resources -Ellensburg
Department of Natural Resources - Olympia
Benton Clean Air Authority
Benton County Engineer/Public Works
Benton-Franklin Health District
Department of Transportation
Washington State Department of Health
Department of Ecology - Olympia
Department of Ecology - Yakima
Benton County Fire Marshal
Dept. of Fish and Wildlife
Bureau of Reclamation
Bureau of Land Management
Fire District # 1
Futurewise
Department of Archaeology/Historic Preservation
Dept. of Ecology - Former Orchard Division
City of Kennewick

CONDITIONS/MITIGATION MEASURES

File No.: EA 2021-014- Mammoth Acres Subdivision

Applicant:
R3T Ventures, LLC
Rob Duncan
2410 N 4th Ave
Pasco, WA 99301

Documents and Regulations:

The environment threshold determination and conditions are based on an analysis of information contained in the following documents or the applicable regulations and restrictions of various agencies:

1. Benton County, BCC Title 6.35 Environmental Policy (SEPA);
2. Benton County, BCC Title 11, Zoning;
3. Benton County, BCC Title 9, Subdivisions;
4. Benton County Comprehensive Plan;
5. Benton County, BCC Title 15 Critical Area Ordinance;
6. Benton County, BCC Title 3 Building Code, Fire Code, and Road Standards;
7. Regulations of the Benton Clean Air Agency;
8. Regulations of the Washington State Department of Ecology and Department of Archaeology and Historic Preservation; and
9. Application submittal materials including a preliminary hydrology report, dated May 6, 2021 and SEPA Environmental Checklist dated May 7, 2021.

Findings:

1. Location:
   a. The site is located approximately 1,000 feet east of the intersection of Cantera Street and Clodfelter Road in the west 800 feet of the northeast quarter and that portion of the southeast quarter lying north of Clodfelter Road, in Section 23, Township 8 North, Range 28 East, W.M. on parcel number 1-2388-100-0003-000.
2. Benton County, BCC Title 11, Zoning:
   a. The zoning designation for the project area is Rural Lands 5-Acre (RL-5). This zoning district has a minimum lot size of five acres; and
   b. A single-family home is an allowed use in the RL-5 Zoning District.
3. Benton County, BCC Title 9, Subdivisions:
   a. Applicant has applied for preliminary plat consideration in accordance with BCC 9.05 Preliminary Plats.
4. Benton County Comprehensive Plan:
   a. The property is designated Rural Remote in the Benton County Comprehensive Plan.
5. Benton County, BCC Title 15, Critical Area Ordinance:
   a. Upon completion of a review of BCC Title 15 and the Benton County Critical Area Maps,

no designated critical areas have been identified on this property. A critical area report is not required for the processing of a preliminary plat at this location.

b. Wetlands: None identified.

c. Critical Aquifer Recharge Area: None identified.

d. Fish and Wildlife Habitat Conservation Area: None identified.

e. Frequently Flooded Areas: None identified.

f. Geologically Hazardous Areas: None identified.

6. The applicant is proposing a preliminary plat with 12 residential lots on 71.50 acres with an average lots size of 5.60 acres.

7. The applicant submitted the following materials for the SEPA review process:

   a. Preliminary hydrology report, dated May 6, 2021; and

   b. SEPA Environmental Checklist dated May 7, 2021.

8. During the SEPA comment period, the State of Washington Department of Archaeology & Historic Preservation commented (see letter dated June 3, 2021) that the project site has the potential to contain archaeological resources. DAHP requested the applicant conduct a professional archaeological survey of the project area prior to ground disturbing activities.

9. During the SEPA comment period, the State of Washington Department of Ecology commented (see letter dated June 7, 2021) that a NPDES Construction Stormwater General Permit is recommended if the project anticipates disturbing ground with the potential for stormwater discharge off-site.

10. During the SEPA comment period, Benton County Public Works commented (see letter dated June 7, 2021) on requirements for road construction, stormwater, signage, survey monuments and drainage easements.

Conditions:

The applicant must complete and comply with the following mitigating conditions for this Mitigated Determination of Non-Significance (MDNS).

1. **Benton County Planning Division**. Meet and comply with BCC Title 9, Subdivisions, including preliminary and final plat requirements, if approved. Contact Benton County Planning Division at 509-786-5612;

2. **Benton County Public Works Department**. Meet and comply with the Benton County Public Works Department requirements stated in the comment letter dated June 7, 2021. For question, please contact Cristina Woods at 509-786-5611.

3. **Benton Clean Air Agency**. Prior to any excavations or construction at the site, the applicant shall meet and comply with the permitting requirements and standards of the Benton Clean Air Agency;

4. **Washington State Department of Ecology**. Meet and comply with Ecology requirements for all activities at the site including obtaining a NPDES Construction Stormwater General Permit as outlined in the comment letter dated June 7, 2021;

5. **Benton Franklin Health District.** Meet and comply with Health District requirements for all activities at the site.

6. **State of Washington Department of Archaeology & Historic Preservation.** Meet and comply with DAHP requirements and recommendations stated in comment letters dated June 3,

2021 prior to ground disturbing activities. A note shall be placed on the subdivision plat specifying DAHP requirements and permitting. If you have questions regarding DAHP permitting, please contact Sydney Hanson at 360-280-7563 or sydney.hanson@dahp.wa.gov.

File No. EA 2021-014

RECEIVED
MAY 7 2021

SEPA ENVIRONMENTAL CHECKLIST

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants:

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals:

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. Background [HELP]

1. Name of proposed project, if applicable:

Mammoth Acres

2. Name of applicant: R3T Ventures LLC

3. Address and phone number of applicant and contact person: 2410 N 4th Ave, Pasco Washington, 99301 Rob Duncan 403-795-5101 Tyler Duncan 403-795-5842

4. Date checklist prepared:
4/26/2021

5. Agency requesting checklist:
Benton County

6. Proposed timing or schedule (including phasing, if applicable):

Begin Construction: 7/2021

End Construction: 10/2021

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

Homes will be constructed on the lots.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

None

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

No

10. List any government approvals or permits that will be needed for your proposal, if known.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

Parcel 123881000003000 is 71.5 acres and will be subdivided into lots averaging 5 acres, divided lots will be used for homesites. Infrastructure including a road, utilities etc. will be provided to the site in compliance with the Benton County stanadard specifications and details.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

Parcel No. 123881000003000
Address: Clodfelter Road
Portion of the East ½ of Section 23, Township 8 North, Range 28 East, Willamette Meridian, Benton County, Washington.
As for legal description please see preliminary plat map 20157

B. Environmental Elements [HELP]

1. *Earth* [help]

a. General description of the site:
Rolling, Property slopes down from south to north
(circle one): Flat, rolling, hilly, steep slopes, mountainous, other _____

b. What is the steepest slope on the site (approximate percent slope)?
Approximately 30% in the center of the site.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.

The site is comprised of mostly warden silt loam. There is no agricultural long term significance. No soil is anticipated to be removed.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

No

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.

The site will be graded to balance cut and fill quantities, only subject to the requirements of the County Road which will be less than 4.2 acres

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Yes, erosion could occur due to rain on unprotected slopes during construction and due to wind on unstabilized soils.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

Approximately 6%

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

Best management practices such as silt fences and water trucks will be used on site during construction. All disturbed areas will be stabilitzed upon completion.

2. Air [help]

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.

Emissions include dust and exhaust from construction activities. Future residences will mean additional vehicle trips generated which will cause additional exhaust emissions.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

No.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

The site will be kept damp within construction areas in order to mitigate airborne dust particles.

3. Water [help]

a. Surface Water: [help]

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

No.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

No.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

None

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

No

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

No

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

No

b. Ground Water: [help]

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

Yes, each lot will require a well.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

Each lot will have its own septic system, domestic sewage.

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

Stormwater runoff will occur and will continue to naturally flow.

2) Could waste materials enter ground or surface waters? If so, generally describe.

No

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

No

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:

None

4. Plants [help]

a. Check the types of vegetation found on the site:

____deciduous tree: alder, maple, aspen, other
____evergreen tree: fir, cedar, pine, other
__x__shrubs
__x__grass
____pasture
____crop or grain
____ Orchards, vineyards or other permanent crops.
____ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
____water plants: water lily, eelgrass, milfoil, other
__x__other types of vegetation

b. What kind and amount of vegetation will be removed or altered?
Surface vegetation will be removed to grade the proposed road.

c. List threatened and endangered species known to be on or near the site.

None

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

None

e. List all noxious weeds and invasive species known to be on or near the site.
None

5. Animals [help]

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site.

None

Examples include:

birds: hawk, heron, eagle, songbirds, other:
mammals: deer, bear, elk, beaver, other:
fish: bass, salmon, trout, herring, shellfish, other _____

b. List any threatened and endangered species known to be on or near the site.

None

c. Is the site part of a migration route? If so, explain.
Yes it is part of the Pacific Flyway as is most of Washington State.

d. Proposed measures to preserve or enhance wildlife, if any:
None

e. List any invasive animal species known to be on or near the site.
None

6. *Energy and Natural Resources* [help]

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Electricity will be used for the project's energy needs.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

No

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

Project will follow energy code requirements

7. *Environmental Health* [help]

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal?

No

If so, describe.

1) Describe any known or possible contamination at the site from present or past uses.
None

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.
None

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.
Construction equipment will have gasoline, diesel, anti-freeze, and hydraulic fluid.
Emergency apparatus and private vehicles will have gasoline, diesel, and anti-freeze.
No storage of hazardous or toxic chemicals on site.

4) Describe special emergency services that might be required.
Typical emergency services such as police, ambulance, and fire could be required.

5) Proposed measures to reduce or control environmental health hazards, if any:
None

b. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

None

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

Typical construction noises will be present during the construction phase of the project. Minimal noise after construction completion associated with residential use.

3) Proposed measures to reduce or control noise impacts, if any:

None

8. Land and Shoreline Use [help]

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.

Property and surrounding properties are zoned residential RL5. Current land use will not be affected.

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?

No

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:

No

c. Describe any structures on the site.

None

d. Will any structures be demolished? If so, what?

No.

e. What is the current zoning classification of the site?

RL5

f. What is the current comprehensive plan designation of the site?

RL5

g. If applicable, what is the current shoreline master program designation of the site?

None.

h. Has any part of the site been classified as a critical area by the city or county? If so, specify.
No

i. Approximately how many people would reside or work in the completed project?
Once the houses are constructed approximately 38 people would live there.

j. Approximately how many people would the completed project displace?
None

k. Proposed measures to avoid or reduce displacement impacts, if any:
None

L. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:
Follow county zoning codes

m. Proposed measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance, if any:
None

9. Housing [help]

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.
None, 12 new single family homes will be constructed. Homes will provide middle-income housing.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.
No residences will be eliminated.

c. Proposed measures to reduce or control housing impacts, if any:
None

10. Aesthetics [help]

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?
Homes will be constructed within zoning limitations for RL5, 35ft.

b. What views in the immediate vicinity would be altered or obstructed?
None

c. Proposed measures to reduce or control aesthetic impacts, if any:
None

11. Light and Glare [help]

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

None

b. Could light or glare from the finished project be a safety hazard or interfere with views?

No

c. What existing off-site sources of light or glare may affect your proposal?

None

d. Proposed measures to reduce or control light and glare impacts, if any:

None

12. Recreation [help]

a. What designated and informal recreational opportunities are in the immediate vicinity?

None

b. Would the proposed project displace any existing recreational uses? If so, describe.

No

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

None

13. Historic and cultural preservation [help]

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers ? If so, specifically describe.

No

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.

No

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.

None

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

If any items of historic, cultural, or archaeological significance are uncovered during construction, the work will be stopped and the appropriate authorities will be notified.

14. Transportation [help]

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.

A new county road will be connected to Clodfelter Road.

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?

None.

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?

No parking spaces will be eliminated.

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).

No.

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

No.

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates?

Per ITE Code 210, single-family detached residences generate an average of 9.44 trips per day. So with 12 new homes, approximately 113 trips per day would be generated by this project.

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.

No

h. Proposed measures to reduce or control transportation impacts, if any:

None.

15. Public Services [help]

a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.

Yes, project would increase needs associated with residential areas including fire, police, emergency, healthcare, and schools.

b. Proposed measures to reduce or control direct impacts on public services, if any.

None

16. Utilities [help]

a. Circle utilities currently available at the site:
electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other _____

Electricity

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

Electricity will be provided by Benton PUD.

C. Signature [HELP]

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: _____

Name of signee ROB DUNCAN

Position and Agency/Organization _____Director R3T Ventrues LLC_____

Date Submitted: May 6 2021

D. Supplemental sheet for nonproject actions [HELP]

(**IT IS NOT NECESSARY** to use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

Proposed measures to avoid or reduce such increases are:

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

Proposed measures to protect or conserve plants, animals, fish, or marine life are:

3. How would the proposal be likely to deplete energy or natural resources?

Proposed measures to protect or conserve energy and natural resources are:

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

Proposed measures to protect such resources or to avoid or reduce impacts are:

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

Proposed measures to avoid or reduce shoreline and land use impacts are:

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

Proposed measures to reduce or respond to such demand(s) are:

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

PCM 1.9

HARMS ENGINEERING, INC.

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MAY 7 2021
Benton Co. Planning Dept.

MAMMOTH ACRES
STORM DRAINAGE CALCULATIONS
PRELIMINARY HYDROLOGY REPORT

Prepared for:

Rob Duncan
R3T Ventures, LLC
2410 N 4th Ave., Pasco, WA 99301
403-795-5101

Project Location:

Parcel #123881000003000
Clodfelter Road, Kennewick, WA

Prepared By:

Christine Batayola, PE

Christine Batayola
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Project #21-058.1

May 2021

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STORM DRAINAGE CALCULATIONS - PRELIMINARY HYDROLOGY REPORT

R3T Ventures
Clodfelter Road, Benton County, Washington
E 1/2, S23, T8N, R28E, WM

Project: Mammoth Acres - Residential Subdivision with 5-acre minimum lots

Objective: Determine volume of stormwater runoff for the storage and infiltration system.

Method: Washington State Department of Ecology Stormwater Management Manual for Eastern Washington, February 2019, Publication Number 18-10-044

Design Storms: 2-year 3-hour storm for construction stormwater
6-month 24-hour storm for volume-based treatment facility sizing.
6-month 3-hour storm for flow-based treatment facility sizing
25-year 24-hour storm for runoff storage volume and infiltration
25-year 3-hour storm for max runoff flow rate
100-year storms for Underground Injection Control (UIC) wells (drywells and infiltration trenches with perforated pipe)
100-year 72-hour regional storm for runoff storage volume and infiltration
100-year 3-hour storm for runoff storage volume and infiltration

Project

A new residential subdivision, Mammoth Acres, is proposed for a 67-acre undeveloped parcel located on the west side of Clodfelter Road near Kennewick, WA. The development includes 12 lots, 5 acres minimum. They will have private wells and on-site septic systems. The plat includes a north south aligned public road, approximately 2,930 ft long with a cul-de-sac at the north end and an existing private road that runs east-west across the property and is approximately 1,110 ft long.

Site

The existing property is undeveloped and slopes generally down from south to north. The steepest slopes are on the west side and are up to 25% in some areas. There is natural drainage channel running south to north along the east side of the property. Existing runoff from the property generally flows to the natural drainage channel and outlets to the north.

Summary of Soils Information

Soils information is from the Custom Soil Resource Report, provided by the United States Department of Agriculture Natural Resources Conservation Service.

NRCS Soil Survey

Soil Types = Ellisforde, Ritzville, and Willis silt loam varying slopes

	Portion of Area	Hydrologic Soil Group	Ksat (in/hr)	Organic Content	CEC (meq/100g)	
EfB	59.50%	C	0.2 to 0.57	1.29%	3.0 to 7.0	
ReB	33.70%	B	0.57 to 1.98	0.99%	5.0 to 10.0	
ReE3	6.70%	B	0.57 to 1.98	0.83%	5.0 to 10.0	
WsE3	0.10%	C	0.0 to 0.06	0.60%	3.0 to 5.0	Insignificant

	Trench/Drywell	Swale	
Ksat vertical =	0.17	0.5	in/hr
Ksat horizontal =	0.50		in/hr
Treatment capacity rating =	High	Table 5.21: Vadose Zone Treatment Capacity	

Well Logs

Material =	Top soil and caliche gravel over brown basalt	
Depth to Restrictive Layer =	32	ft to Brown Basalt
Depth to Groundwater =	540	ft

STORM DRAINAGE CALCULATIONS - PRELIMINARY HYDROLOGY REPORT

R3T Ventures
Clodfelter Road, Benton County, Washington
E 1/2, S23, T8N, R28E, WM

Rainfall for Design Storms:

Precipitation depths are determined from precipitation charts for eastern Washington with adjustments for the 3-hour and 72-hour storms.

City =	Kennewick		
Region =	2		
Annual Rainfall =	6-8 in		
P__yr 3hr =	1.06 * C_{sds} * P2hr2yr		Eq. 4.2 to convert 2yr 2hr storm to 3hr storm for selected return period
C_{sds} =	1		Not used for 2yr storm.
P2yr 2hr =	0.4	in	Figure 4.6 for 2yr 2hr storm
P2yr 3hr =	0.424	in	Total Precipitation for 2yr 3hr storm
C_{sds} 6mo =	0.61		Table 4.7
P6mo 3hr =	0.26	in	Total Precipitation for 6mo 3hr storm
C_{sds} 25yr =	2.17		Table 4.7
P25yr 3hr =	0.92	in	Total Precipitation for 25yr 3hr storm
C_{sds} 100yr =	3.29		Table 4.7
P100yr 3hr =	1.39	in	Total Precipitation for 100yr 3hr storm
P2yr 24hr =	1.00	in	Figure 4.7
C_{wqs} =	0.66		Table 4.5, coefficient to compute 6mo 24hr from 2yr 24hr storm
P6mo 24hr =	0.66	in	
P25yr 24hr =	1.6	in	Figure 4.10 for 25yr 24hr storm
P100yr 24hr =	1.8	in	Figure 4.12 for 100yr 24hr storm
Regional Storm Factor (RSF) =	1.00		Table 4.6
P100yr 72hr =	P100yr 24hr * RSF		Conversion from 24hr to 72hr regional storm
P100yr 72hr =	1.8	in	

Runoff Depth for Design Storms:

SCS curve numbers (CN's) from Table 4.14 are used to determine runoff depths for design storms. These values are based on antecedent moisture condition (AMC) II, with rainfall limits given in Table 4.15 as between 0.5 and 1.1 inches of rain (Dormant Season) in the 5 days prior to the design storm. For 100-year 72-hour storms, the Modified SCS Type 1A design storm requires an adjustment to CN's for AMC's I and III. While Region 2 normally has dry conditions (AMC I) due to low precipitation events, the more conservative CN values for average conditions (AMC II) are used instead. For regions with AMC III, an adjustment is needed to increase CN's for the regional storm.

Antecedent Precipitation =	19%	Table 4.4	
Antecedent Precipitation =	0.342	in	Compare value to the Total 5-Day Antecedent Rainfall for the Dormant Season, Table 4.15, to determine the AMC.
AMC =	I		If AMC I or II, use the CN values directly from Table 4.14 which are based on AMC II. If AMC III, then adjust the CN's for the 72hr regional storm per Table 4.16.

Total Runoff Depth (D) = (P - 0.2 * S)^2 / (P + 0.8 * S) — Eq. 4.20 to estimate runoff using the SCS curve number method.
D = 0 if P<0.2*S
S = (1000 / CN) - 10

	Paved	Gravel	Landscaping/Herbaceous Mix	
CN =	98	89	74	Runoff Curve Number based on soil type and surface cover under average
S =	0.204	1.236	3.514	antecedent moisture conditions, Table 4.14.
D2yr 3hr =	0.250	0.022	0.000	Depth of runoff during 2yr 3hr storm
D6mo 3hr =	0.112	0.000	0.000	Depth of runoff during 6mo 3hr storm
D25yr 3hr =	0.714	0.237	0.013	Depth of runoff during 25yr 3hr storm
D100yr 3hr =	1.177	0.553	0.114	Depth of runoff during 100yr 3hr storm
D2yr 24hr =	0.791	0.285	0.023	Depth of runoff during 2yr 24hr storm
D6mo 24hr =	0.466	0.103	0.000	Depth of runoff during 6mo 24hr storm
D25yr 24hr =	1.379	0.707	0.183	Depth of runoff during 25yr 24hr storm
D100yr 72hr =	1.576	0.865	0.261	Depth of runoff during 100yr 24hr storm

STORM DRAINAGE CALCULATIONS - PRELIMINARY HYDROLOGY REPORT

R3T Ventures
Clodfelter Road, Benton County, Washington
E 1/2, S23, T8N, R28E, WM

Drainage Areas:

Area 1 is the Right of Way, Existing and Proposed, and Area 2 is the lots, Existing and Proposed. Each of the 12 lots is assumed to have 6,000 sf of impervious surfaces (house, concrete patios, driveway aprons, shop, etc.), about 5,000 sf of gravel areas, and the remaining land as landscaped or left as natural vegetation. Refer to attached drainage area exhibit.

		Area 1 - Existing	Area 1 - Proposed	Area 2 - Existing	Area 2 - Proposed
Pervious/Landscaped (sf)		231,060	115,530	2,878,670	2,746,670
Gravel (sf)		0	0	0	60,000
Impervious/Paved (sf)		0	115,530	0	72,000
Total Area (sf)		231,060	231,060	2,878,670	2,878,670
Total Area (acres)		5.30	5.30	66.09	66.09
Percent Impervious		0%	50%	0%	3%
Pervious	CN[1] =	74	74	74	74
	S =	3.514	3.514	3.514	3.455
Impervious	CN =	98	98	98	98
	S =	0.204	0.204	0.204	0.204

[1] - Pervious CN value is a weighted average between landscaping and gravel based on respective areas of each.

Time of Concentration

Determine the total travel time (time of concentration) for runoff from the farthest point on the property to the discharge at the north end. Travel time is broken up into the three legs. The first is the overland flow, which extends for a maximum of 300 ft. Flow then is shallow and concentrated. Eventually flow goes into the natural open channel running along the east property line.

Overland Flow

Use Manning's kinematic solution to compute travel time for overland sheet flow for each subarea, maximum 300' length.

T_t = 60*.007 * (n*L)^0.8 / ((P^0.5) * S^0.4) TR-55 Eq 3-3
n = Mannings roughness Coefficient TR-55 Table 3-1
L = Length of flow path (ft)
P = 2yr 24hr rainfall (in)
S = slope of hyrdaulic grade line (land slope, ft/ft)

n =	0.240	Mannings Roughness Coefficient, TR-55, Table 3-1, Dense Grasses		
L =	300	Length of Flow Path (ft)		
P =	1.0	2-yr 24-hr rainfall (in)		
S =	0.10	slope of hydraulic grade line, (land slope, ft/ft)		
T_{t1} =	0.53	hrs	31.9	min

Shallow Concentrated Flow

T_t =	L / 3600 * V	Travel Time (hours)		
V =	4.4	velocity of flow (ft/sec), TR-55, Figure 3-1		
s =	0.075	slope of hydraulic grade line (land slope, ft/ft)		
L =	1,264	Length of flow path (ft)		
T_{t2} =	0.08	hrs	4.8	min

Open Channel Flow

Assume natural channel with a triangular shape, 6:1 side slopes on each side.

V = (1.49 * r^2/3 * s^0.5) / n
r = hydraulic radius (ft) equal to cross-section all flow area / wetted perimeter

r =	0.247			
s =	0.039	slope of hydraulic grade line (land slope, ft/ft)		
n =	0.035	Mannings Roughness Coefficient, natural channels with rocks and weeds		
V =	3.3	ft/s		
L =	2,486	Length of flow path (ft)		
T_{t3} =	0.21	hrs	12.6	min

$T_c = T_{t1} + T_{t2} + T_{t3}$ = 49.3 min

STORM DRAINAGE CALCULATIONS - PRELIMINARY HYDROLOGY REPORT

R3T Ventures
Clodfelter Road, Benton County, Washington
E 1/2, S23, T8N, R28E, WM

Runoff Volume & Peak Flow:

The peak flow rate is determined using the Santa Barbara Urban Hydrograph Method. The analyses for the 24-hour storms use the Type 1A design storm hyetograph (Table 4.31); the 3-hour analyses use the short duration storm hyetograph (Table 4.33). The 100-year 72-hour regional storm is modeled using the 24-hour Type 1A storm hyetograph with modifications for the regional storm factor and CN as applicable.

Volume of Runoff = (D imp * Imp Area)+(D grvl *Grvl Area) +(D lndscp * Lndscp Area)

	Area 1 - Existing Peak Flow (cfs)	Area 1 - Existing Volume (cf)	Area 1 - Proposed Peak Flow (cfs)	Area 1 - Proposed Volume (cf)	Area 2 - Existing Peak Flow (cfs)	Area 2 - Existing Volume (cf)	Area 2 - Proposed Peak Flow (cfs)	Area 2 - Proposed Volume (cf)
6mo 3hr =	0.000	0	0.205	1,083	0.000	0	0.128	675
6mo 24hr =	0.000	0	0.183	4,483	0.000	0	0.114	3,311
2yr 3hr =	0.000	0	0.470	2,407	0.000	0	0.293	1,611
2yr 24hr =		447		7,838		5,564		11,479
25yr 3hr =	0.027	244	1.373	6,992	0.331	3,038	1.025	8,367
25yr 24hr =	0.071	3,515	0.561	15,031	0.890	43,789	0.972	53,588
100yr 3hr =	0.322	2,194	2.411	12,427	4.007	27,334	5.476	35,904
100yr 72hr =	0.096	5,028	0.646	17,690	1.200	62,644	1.287	73,553

Additonal Runoff	Area 1	Area 2	
25yr 24hr =	11,516	9,799	cf
100yr 72hr =	12,662	10,908	cf

Additional Runoff per lot			
# of Lots =		12	
25yr 24hr =		817	cf/lot
100yr 72hr =		909	cf/lot

Storage & Infiltration System

Runoff from the right of way is directed to roadside swales running along both sides of the roads. Per the County's detail, the standard swale is 2 ft deep with side slopes of 4H:1V and 2H:1V. Due to the sloping roads, reduce the total length available for swales by 50%. Runoff from the private lots is directed to onsite swales the size noted is for each lot. Storage volume required is calculated using the Santa Barbara Urban Hydrograph Method for the Type 1A design storm. No above ground infiltration is included for purposes of sizing the facilities.

Trench/Swale	Area 1 - Proposed	Area 2 - Proposed
Type =	swale	swale
Number of Swales =	N/A	12
Bottom Length (ft) =	3,690	85
Bottom Width (ft) =	0	10
Bottom Area, A_{bot} (sf) =	0	850
Side Slope (H:V)=	4	3
Side Slope (H:V)=	2	3
Depth (ft) =	2.0	2.0
Top Length (ft) =	3,702	97
Top Width (ft) =	12	22
Top Area, A_{top} (sf) =	44,424	2,134
Middle Area, A_{mid} (sf) =	22,176	1,456
Cross-Sectional Area (sf) =	12.0	32.0
Pipe Diameter (in) =	0.0	0.0
Pipe Area (sf) =	0.0	0.0
Rock Porosity[2] =	1	1
Total Storage Volume[3] (cf) =	44,376	35,232
Below Ground Infil. Rate (cfs) =	0.0000	0.0000
Above Ground Rate[4] (cfs) =	0.2571	0.2072

[2] - Rock Porosity = 0.35 for trenches (rock-filled) and 1.0 for swales (not rock-filled)

[3] - Volume formula for swales and trenches: $V = h / 6 * (A_{bot} + 4 * A_{mid} + A_{top})$, where A_{mid} is the surface area of the trench/swale at mid-depth. Areas for irregular shapes measured using CAD software.

[4] - Above ground infiltration rate includes infiltration along the bottom and halfway up the sides of a swale.

STORM DRAINAGE CALCULATIONS - PRELIMINARY HYDROLOGY REPORT

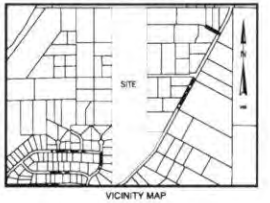
R3T Ventures
Clodfelter Road, Benton County, Washington
E 1/2, S23, T8N, R28E, WM

Design Summary	**Area 1 - Proposed**	**Area 2 - Proposed**	
Length of swale/trench (ft) =	3,690	1,020	
Total Storage Volume (cf) =	44,376	35,232	
Infil. Rate - time to infiltrate (cfs) =	0.2571	0.2072	
25yr24hr			
All Runoff (cf) =	14,668	49,991	
Additional Runoff Only (cf) =	11,516	9,799	
Available/Required =	3.9	3.6	Based on containing additional runoff generated by development.
Sufficient Storage ?	Yes	Yes	
Time to Infiltrate (hr) =	16.2	71.8	
100yr72hr - UIC's only			
All Runoff (cf) =	17,265	69,199	
Additional Runoff Only (cf) =	12,662	10,908	
Available/Required =	3.5	3.2	Based on containing additional runoff generated by development.
Sufficient Storage ?	Yes	Yes	
Time to Infiltrate (hr) =	19.1	98.6	

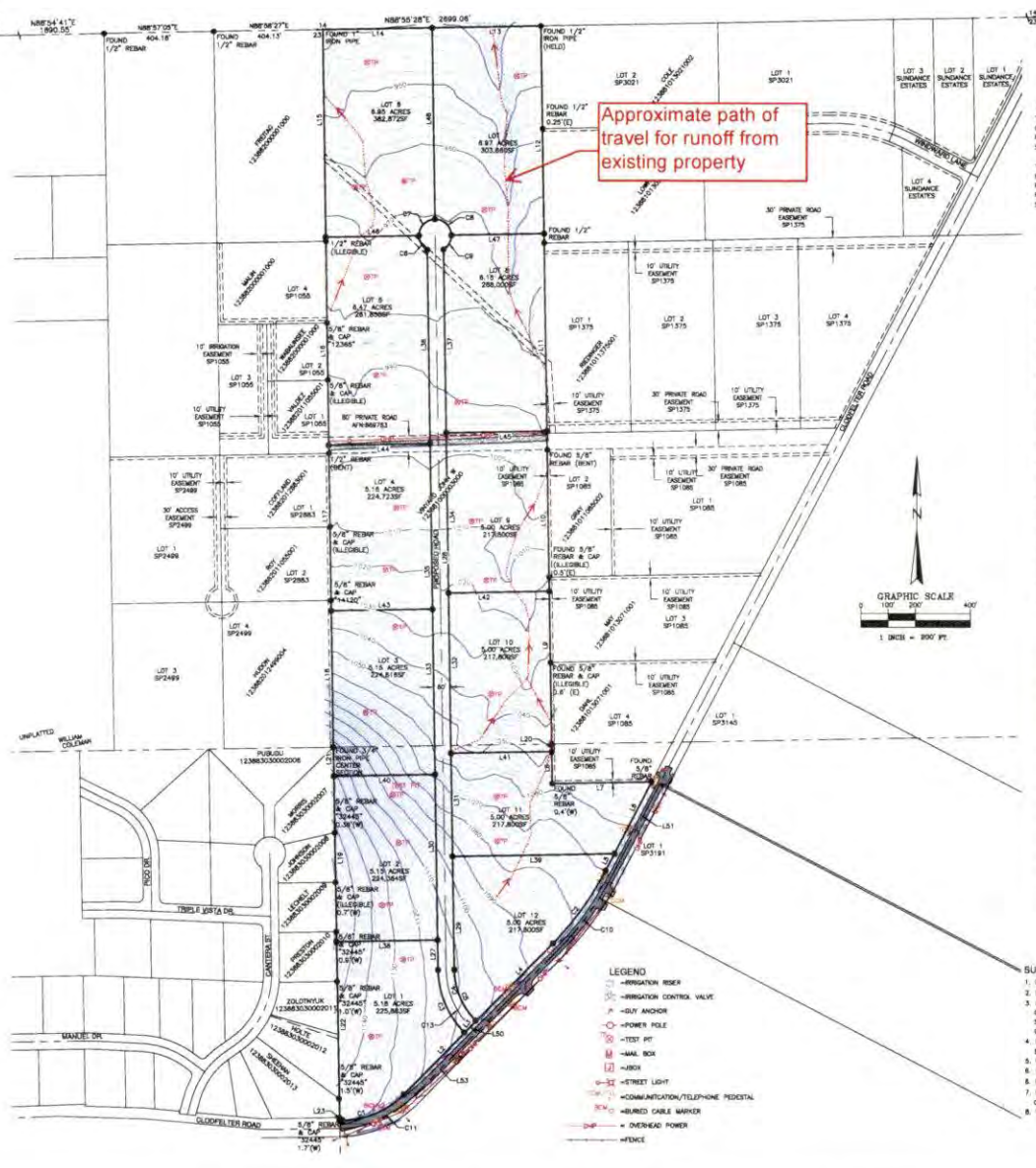
The proposed storage and infiltration facilities are sufficient to store and infiltrate the runoff from the design storms. Each property would need a swale with a base that is 10 ft wide x 85 ft long x 2 ft deep with 3:1 side slopes to contain the additional runoff generated by development and to provide emptying within 72 hours. If infiltration testing shows a higher infiltration rate, the on-site swales could be reduced in size. The County standard roadway ditches would be sufficient to contain and infiltrate the additional runoff generated by the new impervious surfaces for the roads.

PRELIMINARY PLAT FOR MAMMOTH ACRES

PORTION OF THE EAST 1/2 OF SECTION 23, TOWNSHIP 8 NORTH, RANGE 28 EAST, WILLAMETTE MERIDIAN, BENTON COUNTY, WASHINGTON



VICINITY MAP



DESCRIPTION

THE WEST 800 FEET OF THE NORTHEAST QUARTER AND THAT PORTION OF THE SOUTHEAST QUARTER LYING NORTH OF CLODFELTER ROAD, EXCEPT THAT PORTION OF THE NORTH 145 FEET THEREOF LYING EAST OF THE WEST 800 FEET OF SAID SOUTHEAST QUARTER, ALL IN SECTION 23, TOWNSHIP 8 NORTH, 28 EAST, W.M., BENTON COUNTY, WASHINGTON. (TITLE)

THE PORTION OF SECTION 23, TOWNSHIP 8, RANGE 28 DEFINED AS FOLLOWS: THE WEST 800.00 FEET OF THE NORTHEAST QUARTER, SUBJECT TO FUTURE ROAD EASEMENTS, AND THE PORTION OF THE SOUTH-EAST QUARTER LYING NORTH OF CLODFELTER ROAD, EXCEPT THAT PORTION OF THE NORTH 145.00 FEET THEREOF LYING EAST OF THE WEST 800.00 FEET OF SAID SOUTHEAST QUARTER. (SPATELIST BC ASSESSOR)

Line Table		
Line #	Length	Direction
L2	318.52	S44°33'54"W
L3	60.00	S44°33'54"W
L4	401.17	S44°33'54"W
L5	70.44	N27°33'27"E
L6	296.99	N27°33'27"E
L7	367.86	S89°03'54"W
L8	117.38	S01°01'55"E
L9	560.56	N00°57'40"W
L10	588.02	N00°57'40"W
L11	726.31	N00°57'40"W
L12	785.72	N00°57'40"W
L13	2699.09	N88°55'28"E
L14	2699.09	N88°55'28"E
L15	765.12	N00°57'40"W
L16	764.99	N00°57'40"W
L17	807.47	N00°57'40"W

Line Table		
Line #	Length	Direction
L18	501.05	N00°57'40"W
L19	607.43	S01°01'55"E
L20	27.60	S01°01'55"E
L21	106.39	S01°01'55"E
L22	645.84	S01°01'55"E
L23	10.01	S01°01'55"E
L27	110.34	S00°58'12"E
L28	2697.78	S00°58'12"E
L29	416.47	S00°58'12"E
L30	607.43	S00°58'12"E
L31	378.79	S00°58'12"E
L32	588.16	S00°58'12"E
L33	607.45	S00°58'12"E
L34	588.01	S00°58'12"E
L35	607.47	S00°58'12"E
L36	713.14	S00°58'12"E

Line Table		
Line #	Length	Direction
L37	674.39	S00°58'12"E
L38	368.98	S88°58'03"W
L39	596.07	S88°58'03"W
L40	369.62	S88°58'03"W
L41	369.92	S88°58'03"W
L42	369.98	S88°58'03"W
L43	369.66	N88°58'03"E
L44	370.17	S88°58'03"W
L45	370.07	S88°58'03"W
L46	340.16	S88°58'03"W
L47	340.18	S88°58'03"W
L48	705.36	N00°58'12"W
L50	32.70	S45°03'25"E
L51	3519.40	N27°33'27"E
L53	771.44	S44°33'54"W

Curve Table					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD DISTANCE
C1	250.08	320.00	44°46'36"	S66°57'13"W	243.77
C2	331.21	1115.80	17°00'27"	N36°03'41"E	330.00
C3	253.90	329.97	44°05'14"	S23°00'49"E	247.88
C4	230.82	299.97	44°05'14"	S23°00'49"E	225.16
C5	207.73	269.97	44°05'14"	S23°00'49"E	202.65
C6	62.89	59.99	59°52'12"	S31°02'05"E	59.88
C7	94.37	59.99	90°07'48"	S43°57'55"W	84.94
C8	94.24	59.99	90°00'16"	N45°58'03"W	84.85
C9	62.82	59.99	59°59'44"	N29°01'57"E	59.99
C10	340.12	1145.80	17°00'27"	N36°03'41"E	338.87
C11	289.16	370.00	44°46'36"	S66°57'13"W	281.85
C12	230.84	300.00	44°05'14"	S22°08'08"E	225.19
C13	230.82	299.97	44°05'14"	S23°00'49"E	225.16

SURVEYOR'S NOTES

1. DATE OF SURVEY/MONUMENTS VISITED: APRIL 2021.
2. BASIS OF BEARING: NAD83(93) WASHINGTON STATE PLANE COORDINATE SYSTEM, SOUTH ZONE.
3. UNITS OF MEASURE: US SURVEY FEET GRID DISTANCES. MULTIPLY GRID DISTANCES BY A COMBINED SCALE FACTOR OF 1.000104457 TO ACHIEVE GROUND DISTANCES. REFERENCE SURVEY AND LOT AREAS ARE GROUND DISTANCES. MULTIPLY GROUND DISTANCES BY A COMBINED SCALE FACTOR OF 0.999895554 TO ACHIEVE SURVEYED GRID DISTANCES.
4. EQUIPMENT/PROCEDURES: TOPCON GR3 GNSS, RTK METHOD. LINEAR CLOSURES MEET OR EXCEED STANDARDS CONTAINED IN WAC 332-130-090.
5. ● FOUND AS NOTED.
6. ● SET 5/8" REBAR & CAP STAMPED "PERMIT 54534"
7. REFERENCE SURVEY: RECORD OF SURVEY NO. 4720, AUDITOR'S FILE NO. 2018-007807.
8. CONTOURS: 2' CONTOURS DERIVED FROM GROUND SURVEY WITH AN ACCURACY OF 1/10TH THE CONTOUR INTERVALS.
9. THE PURPOSE OF THIS TOPOGRAPHIC SURVEY IS FOR A PRELIMINARY PLAT APPLICATION.

PRE-PLAT NOTES

1. OWNER: JOHN W. VINYARD
2. ADDRESS: UNDETERMINED WA (MAILING: 1417 WATERFORD GREEN DR MARIETTA, GA 30068-2910)
3. PARCEL NO. 123811000003000
4. DEVELOPING AREA: 87.30 ACRES (ASSESSOR) 71.50 ACRES (SURVEY)
5. ZONING: RL-5
6. ACREAGE PROPOSED LOT SIZE: ~5.00 ACRES
7. EXISTING USE: VACANT
8. PROPOSED USE: RESIDENTIAL

DEVELOPER:

ROB DUNCAN
R3T VENTURES
2410 N 4TH AVE
PASCO WA 99301
DIRECT: (403)795-5101
EMAIL: MAILINGADDRESSFORWARDGROUP.CA

ENGINEER:

CHRISTY BATAYOLA, PE
PRESIDENT
632 W SYLVESTER STREET
PASCO WA 99301
(O) 509.547.2679
(M) 509.308.0805
CHRISTINE@HWMENGINEERING.COM
HWMENGINEERING.COM

SURVEYOR'S CERTIFICATION

I, ASHLEY D. GARZA, A REGISTERED LAND SURVEYOR, HEREBY CERTIFY THAT THE PLAT AS SHOWN HEREON IS BASED ON AN ACTUAL FIELD SURVEY OF THE LAND DESCRIBED AND THAT ALL CORNERS AND DIMENSIONS ARE CORRECTLY SHOWN AND THAT SAID PLAT IS STAKED ON THE GROUND AS INDICATED HEREON.

PRELIMINARY

ASHLEY D. GARZA, CERTIFICATE NO. 54534 — DATE

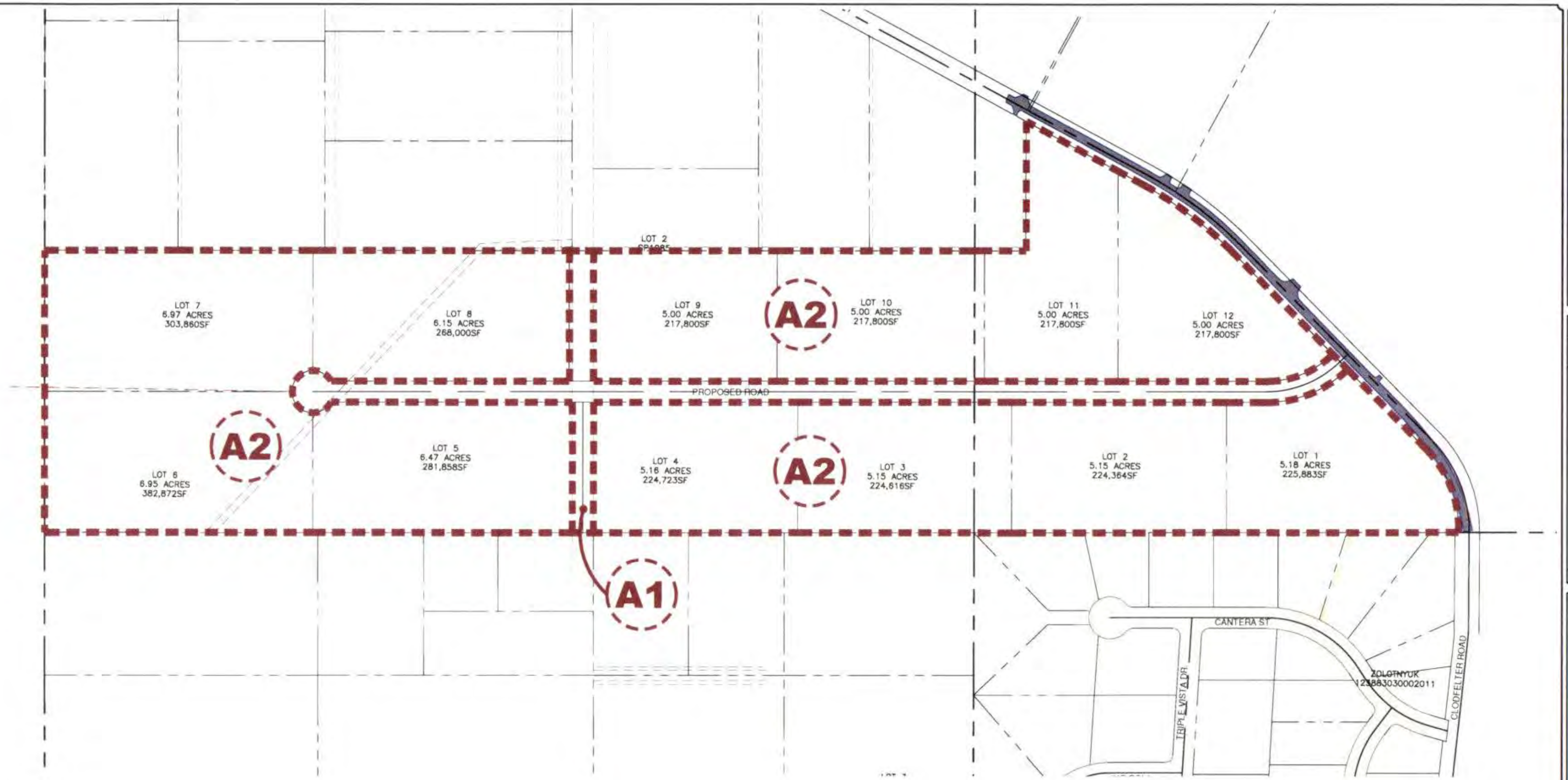
ASHLEY D. GARZA — 54534 — REGISTERED LAND SURVEYOR

PERMIT SURVEYING INC
2245 Robertson Drive
Richland, Washington 99354
OFFICE 509-375-4123
FAX 509-371-0999

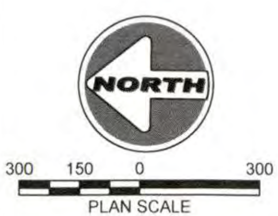
R3T VENTURES

PRELIMINARY PLAT AT CLODFELTER ROAD KENNEWICK, WASHINGTON

PROJECT NO.	20137
DRAWN BY:	SDA
CHECKED BY:	ADG
SCALE:	1" = 200'
	04/25/21
SHEET	1 OF 1



A1 = 231,060 SF
A2 = 2,878,670 SF



HARMS ENGINEERING, INC.
1632 W Sylvester Street, Pasco WA 99301 | 509.547.2679 | HarmsEngineering.com
Designed By: C BATAYOLA / B ANDERSON
Drawn By: THUNT
File Name: EXHIBIT
Plotted: May 5, 2021, 4:48:02 PM

Rev	Description	By	Date

Drawing Name
R3T VENTURES CLODFELTER SUBDIVISION
STORM DRAIN AREAS
BENTON COUNTY, WASHINGTON

Client/Project Information

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Date: 05-05-2021
Project Number
Sheet Number: EX1B

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

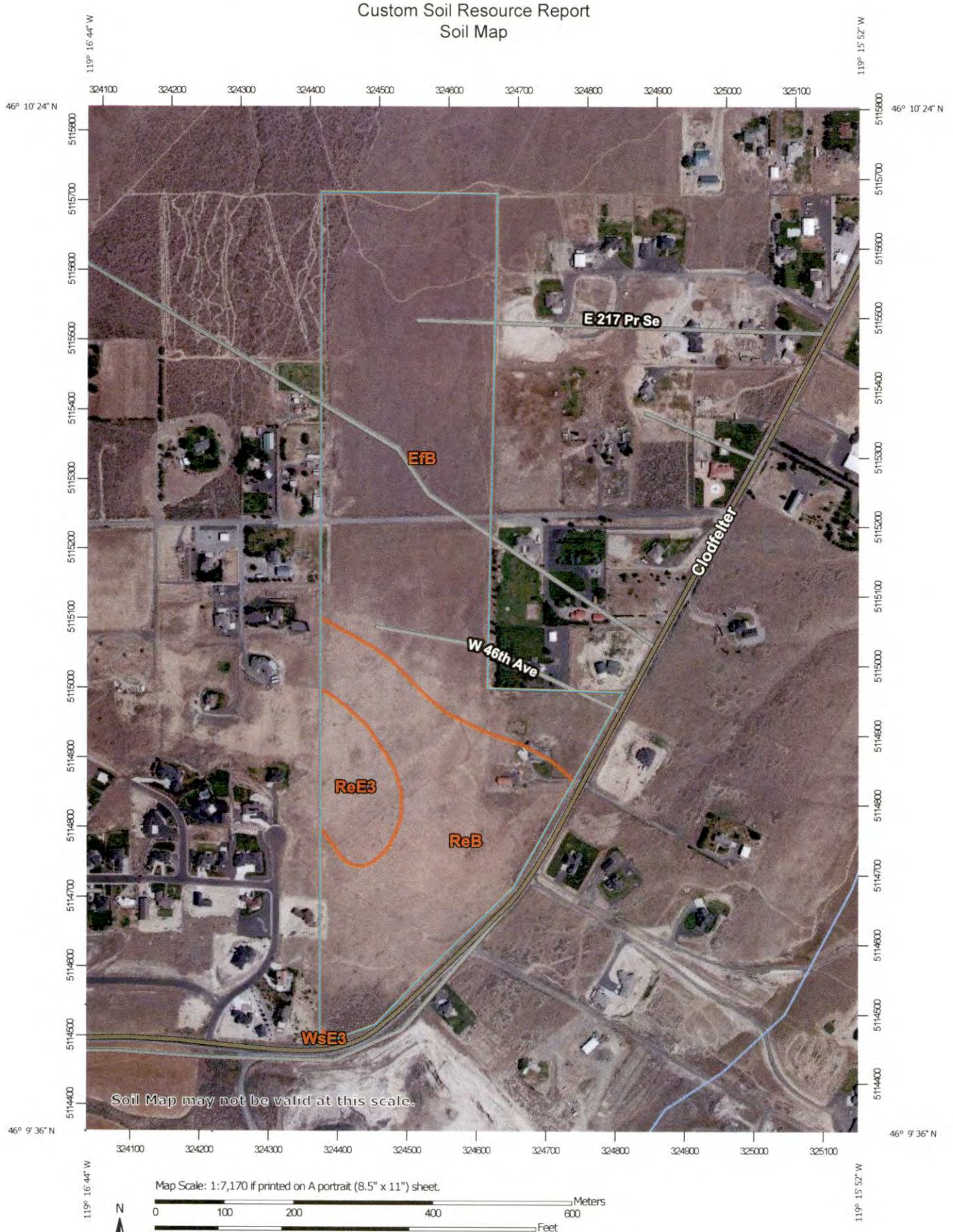
A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Benton County Area, Washington

Mammoth Acres

May 5, 2021

Custom Soil Resource Report
Soil Map



Map Scale: 1:7,170 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 300 600 1200 1800

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

Benton County Area, Washington

EfB—Ellisforde silt loam, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2bbw
Elevation: 400 to 2,100 feet
Mean annual precipitation: 8 to 12 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 135 to 190 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Ellisforde and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ellisforde

Setting

Landform: Terraces
Parent material: Loess over lacustrine deposits

Typical profile

H1 - 0 to 13 inches: silt loam
H2 - 13 to 29 inches: silt loam
H3 - 29 to 60 inches: stratified very fine sandy loam to silt loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water capacity: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R008XY101WA
Hydric soil rating: No

ReB—Ritzville silt loam, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2bd7

Elevation: 800 to 3,000 feet
Mean annual precipitation: 9 to 12 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 100 to 180 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Ritzville and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ritzville

Setting
Landform: Hillslopes
Parent material: Loess

Typical profile
H1 - 0 to 6 inches: silt loam
H2 - 6 to 36 inches: silt loam
H3 - 36 to 60 inches: silt loam

Properties and qualities
Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 12.0 inches)

Interpretive groups
Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R008XY101WA
Hydric soil rating: No

ReE3—Ritzville silt loam, 15 to 30 percent slopes, severely eroded

Map Unit Setting
National map unit symbol: 2bd8
Elevation: 800 to 3,000 feet
Mean annual precipitation: 9 to 12 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 100 to 180 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Ritzville and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ritzville

Setting

Landform: Hillslopes
Parent material: Loess

Typical profile

H1 - 0 to 2 inches: silt loam
H2 - 2 to 36 inches: silt loam
H3 - 36 to 60 inches: silt loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R008XY101WA
Hydric soil rating: No

WsE3—Willis silt loam, 15 to 30 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 2bfy
Elevation: 1,000 to 3,000 feet
Mean annual precipitation: 9 to 12 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 125 to 180 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Willis and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Willis

Setting

Landform: Hillslopes, ridges
Parent material: Loess over residuum weathered from basalt

Typical profile

H1 - 0 to 2 inches: silt loam
H2 - 2 to 10 inches: silt loam
H3 - 10 to 20 inches: silt loam
H4 - 20 to 34 inches: cemented material

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 20 to 36 inches to duripan
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R008XY101WA
Hydric soil rating: No

Table—Organic Matter

Map unit symbol	Map unit name	Rating (percent)	Acres in AOI	Percent of AOI
EfB	Ellisforde silt loam, 0 to 5 percent slopes	1.29	46.5	59.5%
ReB	Ritzville silt loam, 0 to 5 percent slopes	0.99	26.3	33.7%
ReE3	Ritzville silt loam, 15 to 30 percent slopes, severely eroded	0.83	5.3	6.7%
WsE3	Willis silt loam, 15 to 30 percent slopes, severely eroded	0.60	0.1	0.1%
Totals for Area of Interest			**78.1**	**100.0%**

Rating Options—Organic Matter

Units of Measure: percent

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Interpret Nulls as Zero: No

Layer Options (Horizon Aggregation Method): Depth Range (Weighted Average)

Top Depth: 0

Bottom Depth: 18

Units of Measure: Inches

Chemical Soil Properties–Benton County Area, Washington								
Map symbol and soil name	**Depth**	**Cation-exchange capacity**	**Effective cation-exchange capacity**	**Soil reaction**	**Calcium carbonate**	**Gypsum**	**Salinity**	**Sodium adsorption ratio**
	In	*meq/100g*	*meq/100g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
EfB—Ellisforde silt loam, 0 to 5 percent slopes								
Ellisforde	0-13	3.0-7.0	—	6.6-7.8	0	0	0	0
	13-29	2.0-5.0	—	7.4-8.4	1-5	0	0.0-4.0	0
	29-60	2.0-4.0	—	7.9-8.4	5-15	0	0.0-4.0	0
ReB—Ritzville silt loam, 0 to 5 percent slopes								
Ritzville	0-6	5.0-10	—	6.6-8.4	0	0	0	0
	6-36	5.0-10	—	6.6-8.4	0	0	0	0
	36-60	5.0-10	—	7.9-8.4	5-15	0	0.0-2.0	0
ReE3—Ritzville silt loam, 15 to 30 percent slopes, severely eroded								
Ritzville	0-2	5.0-10	—	6.6-8.4	0	0	0	0
	2-36	5.0-10	—	6.6-8.4	0	0	0	0
	36-60	5.0-10	—	7.9-8.4	5-15	0	0.0-2.0	0
WsE3—Willis silt loam, 15 to 30 percent slopes, severely eroded								
Willis	0-2	2.0-5.0	—	6.6-7.8	0	0	0	0
	2-10	3.0-5.0	—	7.4-8.4	0	0	0	0
	10-20	2.0-4.0	—	7.9-8.4	1-10	0	0.0-2.0	0
	20-34	—	—	—	—	—	—	—

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report

WATER WELL REPORT

Original & 1st copy – Ecology, 2nd copy – owner, 3rd copy – driller

DEPARTMENT OF ECOLOGY State of Washington

Construction/Decommission *("x" in circle)*

☒ Construction

☐ Decommission *ORIGINAL INSTALLATION*

Notice of Intent Number _____

CURRENT

Notice of Intent No. WE 28048

Unique Ecology Well ID Tag No. BJD-437

Water Right Permit No. _____

Property Owner Name APOSTOLIC LUTHERN CHURCH

Well Street Address 33203 CLODFELTER

City KENNEWICK County BENTON

Location NW 1/4-1/4 SE 1/4 Sec 23 Twn 8N R 28 EWM ☒ Or WWM ☐

(s, t, r Still REQUIRED)

Lat/Long

Lat Deg _____ Lat Min/Sec _____

Long Deg _____ Long Min/Sec _____

Tax parcel No. (Required) 123884031910 01

PROPOSED USE: ☒ Domestic ☐ Industrial ☐ Municipal ☐ DeWater ☐ Irrigation ☐ Test Well ☐ Other _____

TYPE OF WORK: Owner's number of well (if more than one) _____

☒ New well ☐ Reconditioned *Method:* ☐ Dug ☐ Bored ☐ Driven ☐ Deepened ☐ Cable ☒ Rotary ☐ Jetted

DIMENSIONS: Diameter of well 8 inches, drilled 665 ft.

Depth of completed well 665 ft.

CONSTRUCTION DETAILS

Casing ☒ Welded 8" Diam. from +1½ ft. to 38½ ft.

Installed: ☒ Liner installed 6" Diam. from -25 ft. to 665 ft.

☐ Threaded _____" Diam. From _____ ft. to _____ ft.

Perforations: ☒ Yes ☐ No

Type of perforator used SAW

SIZE of perfs ¼ in. by 6 in. and no. of perfs 68 from 645 ft. to 665 ft.

Screens: ☐ Yes ☒ No ☐ K-Pac Location _____

Manufacturer's Name _____

Type _____ Model No. _____

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel/Filter packed: ☐ Yes ☒ No Size of gravel/sand _____

Materials placed from _____ ft. to _____ ft.

Surface Seal: ☒ Yes ☐ No To what depth? 18 ft.

Material used in seal BENTONITE

Did any strata contain unusable water? ☐ Yes ☒ No

Type of water? _____ Depth of strata _____

Method of sealing strata off _____

PUMP: Manufacturer's Name _____

Type: _____ H.P. _____

WATER LEVELS: Land-surface elevation above mean sea level _____ ft.

Static level 540 ft. below top of well Date 6-28-2017

Artesian pressure _____ lbs. per square inch Date _____

Artesian water is controlled by _____ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☒ No If yes, by whom? _____

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____

Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.

Airtest 20+ gal./min. with stem set at 660 ft. for 1 hrs.

Artesian flow _____ g.p.m. Date _____

Temperature of water _____ Was a chemical analysis made? ☐ Yes ☒ No

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
SOIL + CALICHE GRAVEL	0	32
BROWN BASALT	32	36
BLACK BASALT	36	95
GRAY HARD BASALT	95	131
BROWN CLAYSTONE	131	133
GRAY HARD BASALT	133	416
BLACK BASALT W/ BROWN CLAYSTONE	416	474
GRAY BASALT	474	510
BLACK VESCULAR BASALT	510	531
BROWN BASALT	531	552
GRAY HARD "	552	648
BROWN YELLOW CLAYSTONE	648	663
GRAY BASALT	663	665

RECEIVED

AUG 3 2017

Dept. of Ecology Central Regional Office

Start Date 6/20/17 Completed Date 6/28/17

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee Name B M VOTH

Driller/Engineer/Trainee Signature _____

Driller or trainee License No. 2094

IF TRAINEE: Driller's License No: _____

Driller's Signature: _____

Drilling Company FIVE STAR DRILLING

Address 36301 HIGHWAY 12

City, State, Zip DAYTON, WA 99328

Contractor's Registration No. FIVESOF077MB Date 6/28/2017

ECY 050-1-20 (Rev 02-2010) To request ADA accommodation including materials in a format for the visually impaired, call Ecology Water Resources Program at 360-407-6872. Persons with impaired hearing may call Washington Relay Service at 711. Persons with speech disability may call TTY at 877-833-6341.

Table 4.5: Values of Coefficient C_{wqs} for Computing 6-Month, 24-Hour Precipitation

Climate Region Number	Climate Region Name	C_{wqs}
1	East Slope Cascades	0.70
2	Central Basin	0.66
3	Okanogan, Spokane, Palouse	0.69
4	Northeastern & Blue Mountains	0.70

Note: Values of C_{wqs} are based on the generalized extreme value (GEV) distribution whose distribution parameters can be expressed as a function of mean annual precipitation for eastern Washington.

Table 4.6: Factors for Converting From 24-Hour to Regional Storm Precipitation Depth

Climate Region Number	Climate Region Name	Multiplication Factor for Converting From 24-Hour to Regional Storm Precipitation Depth
1	East Slope Cascades	1.16
2	Central Basin	1.00
3	Okanogan, Spokane, Palouse	1.06
4	Northeastern & Blue Mountains	1.07

4.3.8 Precipitation Magnitude and Frequency for Short-Duration Storms

Design of flow-rate-based treatment BMPs using the single-event hydrograph method requires a determination of the 6-month, 3-hour precipitation depth for use with the 3-hour short-duration design storm hyetograph. (The updated design storm is indexed to sum to unity at 3 hours, so the 3-hour precipitation depth is needed to scale the hyetograph.) Design of other BMPs or conveyance elements based on the short-duration storm may also require the conversion of the 2-year, 2-hour precipitation to a 3-hour precipitation depth for a different recurrence interval.

The isopluvial map that is used as the starting point for determining the design precipitation depth for a 3-hour short-duration storm is a 2-year, 2-hour precipitation isopluvial map (Figure 4.6: 2-Year, 2-Hour Isopluvial Map).

The following equation is used to determine 3-hour precipitation for a selected return period:

Equation 4.2: Short-Duration Storm

$$P_{sds} = 1.06 * C_{sds} * P_{2yr2hr}$$

where:

P_{sds} = 3-hour precipitation (inches) for a selected return period for the short-duration storm

1.06 = multiplier used for all climate regions to convert x-year, 2-hour precipitation to x-year, 3-hour precipitation

C_{sds} = coefficient (from Table 4.3.6) for converting 2-year, 2-hour precipitation to x-year, 2-hour precipitation depth

P_{2yr2hr} = 2-year, 2-hour precipitation (inches) from Figure 4.6: 2-Year, 2-Hour Isopluvial Map

Table 4.7: Values of the Coefficient Csds for Using 2-Year, 2-Hour Precipitation to Compute 2-Hour Precipitation for Selected Periods of Return lists values of the coefficient C_{sds} for selected return periods for various magnitudes of mean annual precipitation. An isopluvial map of average annual precipitation is shown in Figure 4.1: Average Annual Precipitation and Climate Regions and can be used to determine the mean annual precipitation for the site.

Table 4.7: Values of the Coefficient C_{sds} for Using 2-Year, 2-Hour Precipitation to Compute 2-Hour Precipitation for Selected Periods of Return

Climate Region Number	Mean Annual Precipitation (inches)	6-Month	1-Year	10-Year	25-Year	50-Year	100-Year
2	6-8	0.61	0.79	1.63	2.17	2.68	3.29
	8–10	0.62	0.80	1.60	2.09	2.55	3.09
	10–12	0.64	0.81	1.56	2.02	2.44	2.92
2, 3	12–16	0.66	0.82	1.51	1.90	2.26	2.66
3	16–22	0.67	0.83	1.47	1.82	2.13	2.48
1, 4	22–28	0.69	0.84	1.43	1.74	2.01	2.31
	28–40	0.70	0.85	1.40	1.68	1.92	2.19
	40–60	0.72	0.86	1.36	1.61	1.82	2.05
	60–120	0.74	0.87	1.33	1.55	1.74	1.93

Notes

- The value for 2-hour precipitation is converted to 3-hour precipitation using a multiplier of 1.06 for all recurrence intervals.
- Values of C_{sds} are based on the generalized extreme value (GEV) distribution whose distribution parameters can be expressed as a function of mean annual precipitation for eastern Washington.

High ground water or shallow bedrock can cause a significant increase in runoff. If either of these conditions exists, it needs to be addressed by the designer. For a more complete discussion of computing weighted CN values, see *Urban Hydrology for Small Watersheds* (USDA, 1986).

Table 4.14: Runoff Curve Numbers (CNs) for Selected Agricultural, Suburban, and Urban Areas

Cover type and hydrologic condition	CNs for hydrologic soil group			
	A	B	C	D
Open space (lawns, parks, golf courses, cemeteries, landscaping, etc.)[a]				
Poor condition (grass cover <50% of the area)	68	79	86	89
Fair condition (grass cover on 50% to 75% of the area)	49	69	79	84
Good condition (grass cover on >75% of the area)	39	61	74	80
Impervious areas				
Open water bodies: lakes, wetlands, ponds etc.	100	100	100	100
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	98	98	98	98
Permeable pavers and permeable interlocking concrete (assumed as 85% impervious and 15% lawn)				
Fair lawn condition (weighted average CNs)	95	96	97	97
Gravel (including right-of-way)	76	85	89	91
Dirt (including right-of-way)	72	82	87	89
Pasture, grassland, or range-continuous forage for grazing				
Poor condition (ground cover <50% or heavily grazed with no mulch)	68	79	86	89
Fair condition (ground cover 50% to 75% and not heavily grazed)	49	69	79	84
Good condition (ground cover >75% and lightly or only occasionally grazed)	39	61	74	80
Cultivated agricultural lands				
Row Crops (good) e.g., corn, sugar beets, soy beans	64	75	82	85
Small Grain (good) e.g., wheat, barley, flax	60	72	80	84
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)				

Table 4.14: Runoff Curve Numbers (CNs) for Selected Agricultural, Suburban, and Urban Areas (continued)

Cover type and hydrologic condition	CNs for hydrologic soil group			
	A	B	C	D
Poor (<50% ground cover)	48	67	77	83
Fair (50% to 75% ground cover)	35	56	70	77
Good (>75% ground cover)	30[b]	48	65	73
Woods-grass combination (orchard or tree farm)[c]				
Poor	57	73	82	86
Fair	43	65	76	82
Good	32	58	72	79
Woods				
Poor (Forest litter, small trees, and brush destroyed by heavy grazing or regular burning)	45	66	77	83
Fair (Woods are grazed but not burned, and some forest litter covers the soil)	36	60	73	79
Good (Woods are protected from grazing, and litter and brush adequately cover the soil)	30	55	70	77
Herbaceous (mixture of grass, weeds, and low-growing brush, with brush the minor element)				
Poor (<30% ground cover)	n/a[d]	80	87	93
Fair (30% to 70% ground cover)		71	81	89
Good (>70% ground cover)		62	74	85
Sagebrush with grass understory				
Poor (<30% ground cover)	n/a[d]	67	80	85
Fair (30% to 70% ground cover)		51	63	70
Good (>70% ground cover)		35	47	55

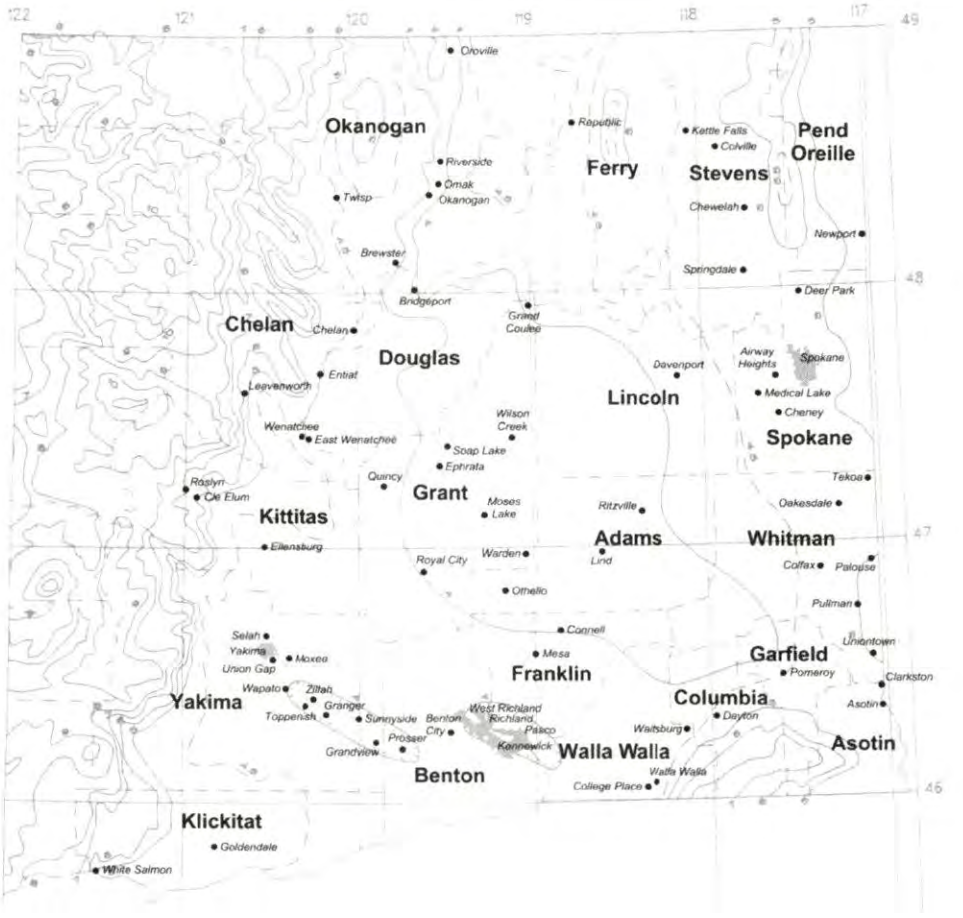
[a]Composite CNs may be computed for other combinations of open space cover type.

[b]Actual CN is < 30; use CN = 30 for runoff computations.

[c]The indicated CNs were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CNs for woods and pasture.

[d]CNs have not been developed for hydrologic soil group A.

Figure 4.6: 2-Year, 2-Hour Isopluvial Map



SOURCE: *Dam Safety Guidelines, Technical Note 3, Design Storm Construction, Washington State Department of Ecology, Water Resources Program, report 92-55G April 1993*

DEPARTMENT OF ECOLOGY
State of Washington

2-Year, 2-Hour Isopluvial Map

Revised April 2002

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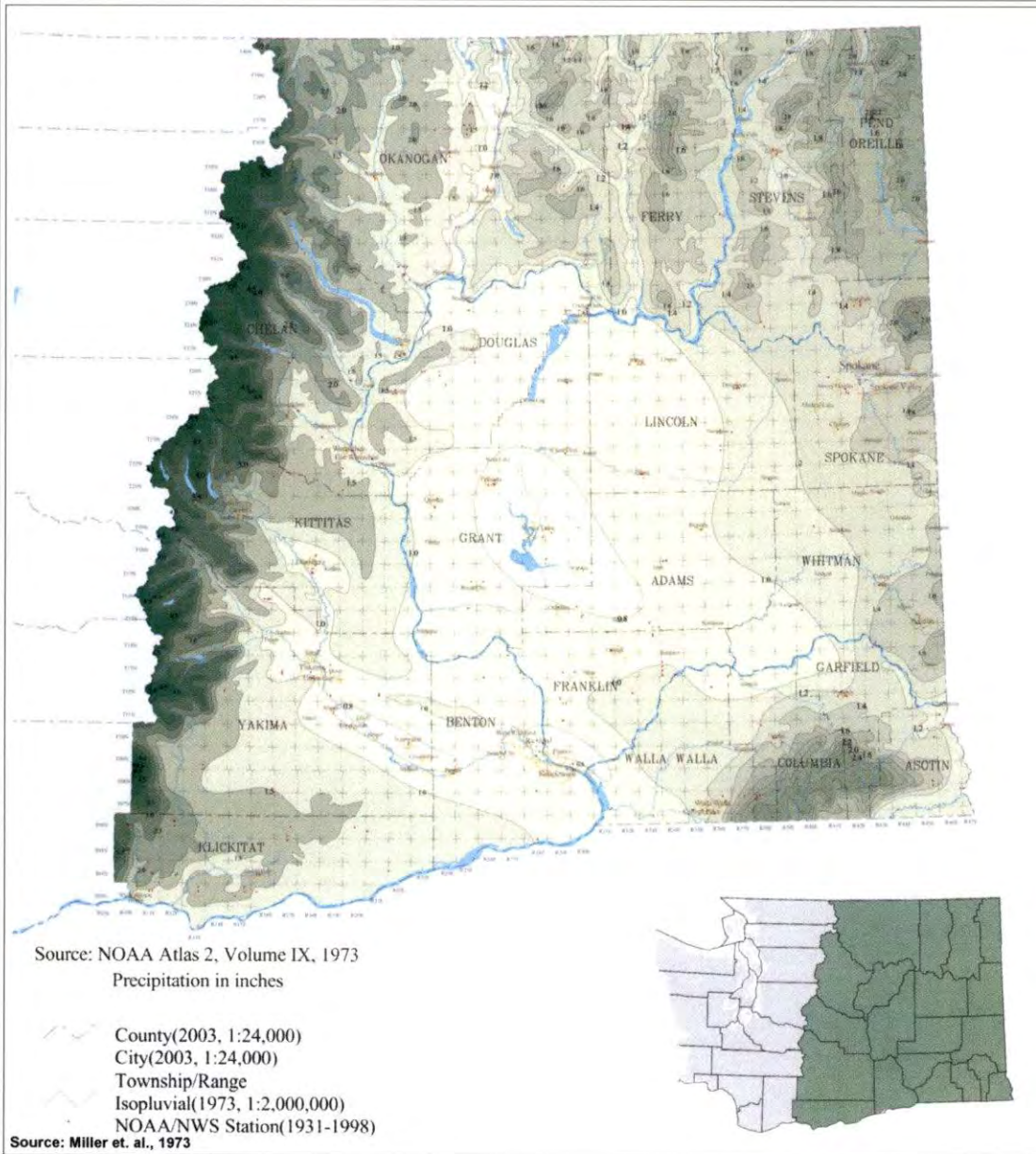
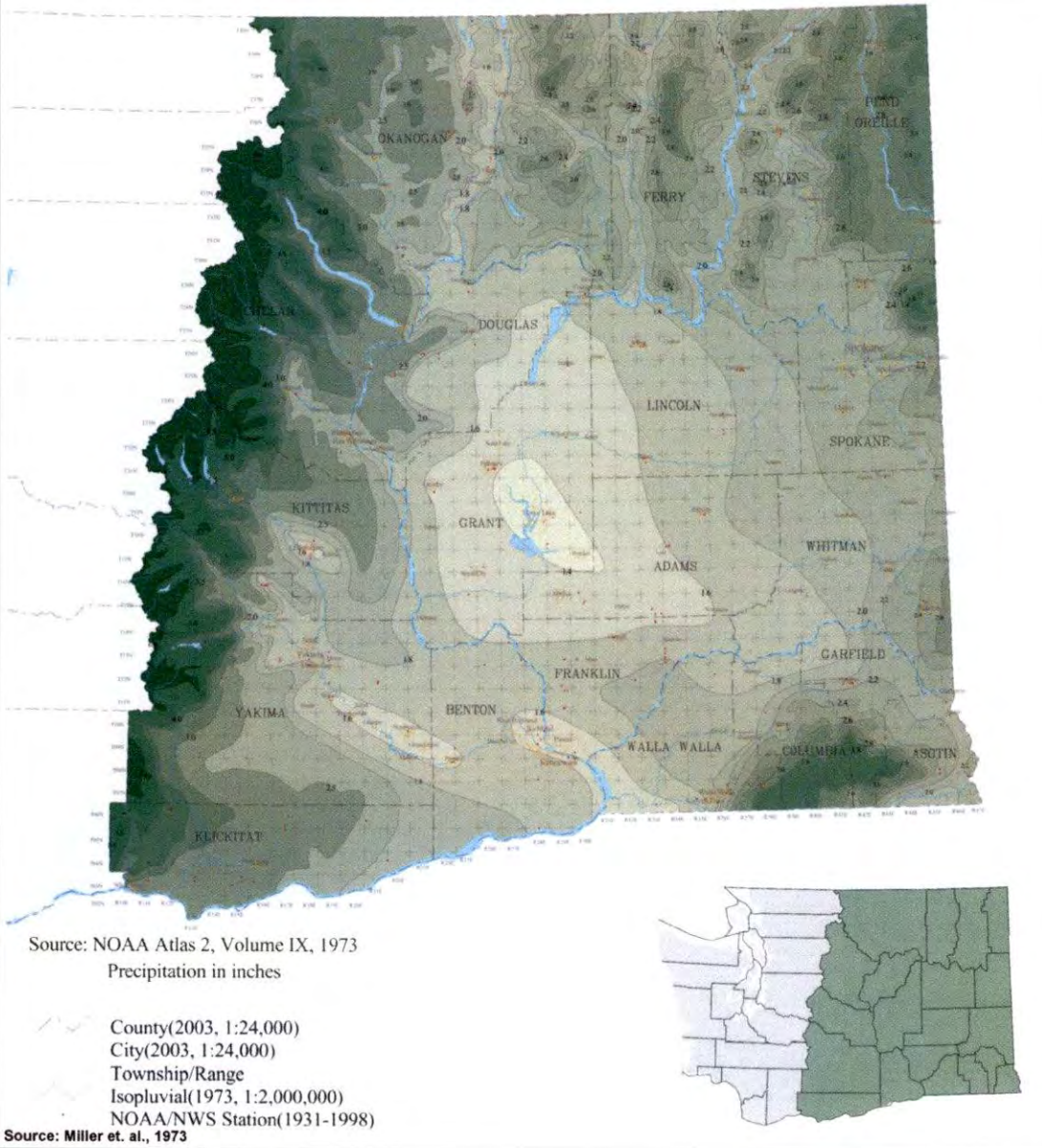
Kennewick, West Richland, Richland, and Pasco are within the 0.4 inch Isopluvial. Benton City is at approx 0.41 inches.

Figure 4.7: 2-Year, 24-Hour Isopluvial Map



West Richland, north Richland, and north Pasco are within the 0.8 inch Isopluvial. Kennewick, south Richland, and south Pasco are within the 1.0 inch Isopluvial

Figure 4.10: 25-Year, 24-Hour Isopluvial Map



DEPARTMENT OF ECOLOGY
State of Washington

25-Year, 24-Hour Isopluvial Map

Revised March 2005

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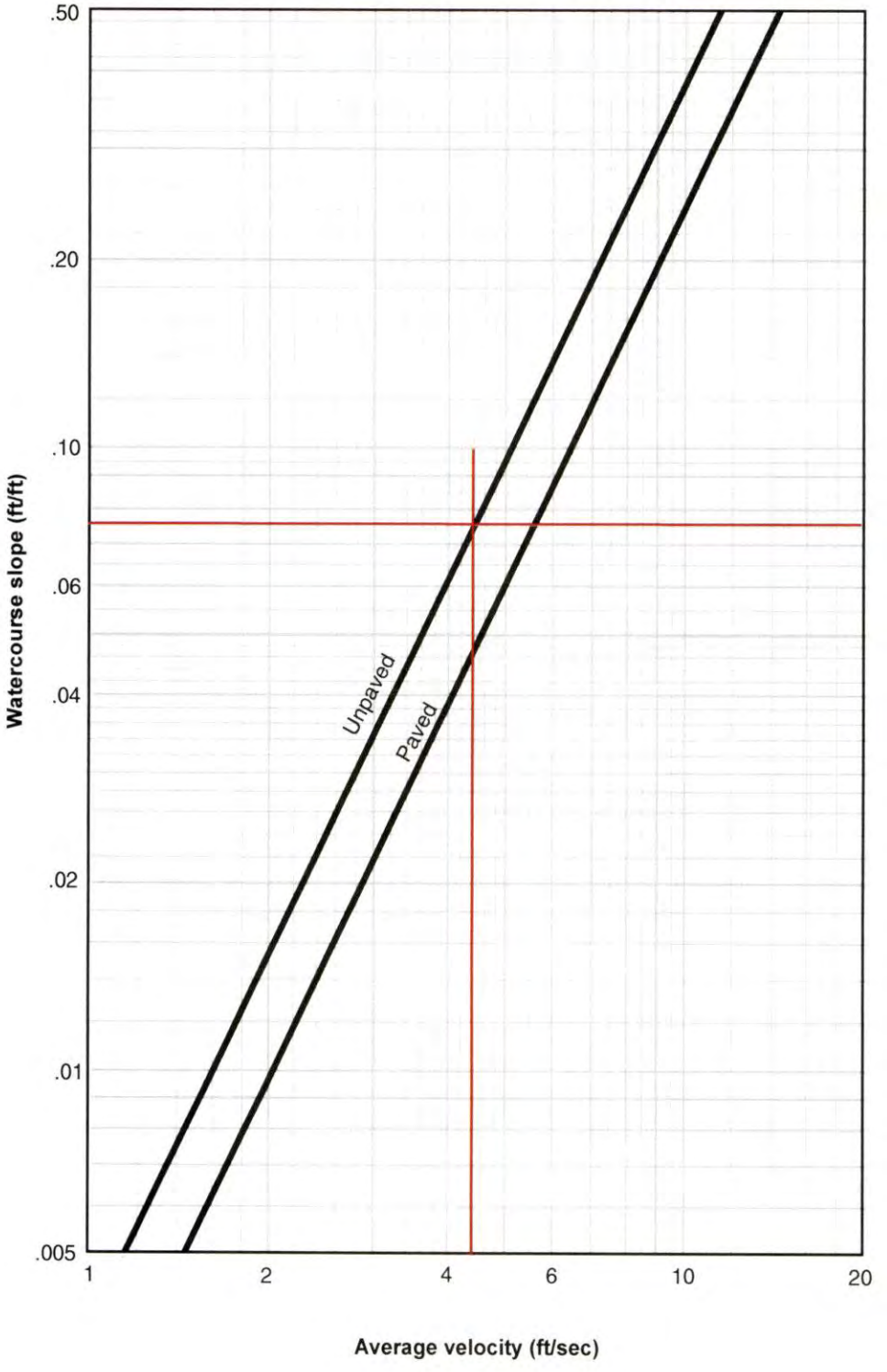
Kennewick, West Richland, Richland, Pasco are within the 1.6 inch Isopluvial. Benton City is at about 1.62 inches. Walla Walla=2.2in

Figure 4.12: 100-Year, 24-Hour Isopluvial Map

Kennewick, West Richland, Richland, Pasco are within the 1.8 inch Isopluvial. Benton City is at about 1.82 inches. Walla Walla = 2.6in

Figure 3-1 Average velocities for estimating travel time for shallow concentrated flow



Sheet flow

Sheet flow is flow over plane surfaces. It usually occurs in the headwater of streams. With sheet flow, the friction value (Manning's n) is an effective roughness coefficient that includes the effect of raindrop impact; drag over the plane surface; obstacles such as litter, crop ridges, and rocks; and erosion and transportation of sediment. These n values are for very shallow flow depths of about 0.1 foot or so. Table 3-1 gives Manning's n values for sheet flow for various surface conditions.

Table 3-1 Roughness coefficients (Manning's n) for sheet flow

Surface description	n [1]
Smooth surfaces (concrete, asphalt, gravel, or bare soil)	0.011
Fallow (no residue)	0.05
Cultivated soils:	
Residue cover ≤20%	0.06
Residue cover >20%	0.17
Grass:	
Short grass prairie	0.15
Dense grasses [2]	0.24
Bermudagrass	0.41
Range (natural)	0.13
Woods: [3]	
Light underbrush	0.40
Dense underbrush	0.80

[1] The n values are a composite of information compiled by Engman (1986).

[2] Includes species such as weeping lovegrass, bluegrass, buffalo grass, blue grama grass, and native grass mixtures.

[3] When selecting n , consider cover to a height of about 0.1 ft. This is the only part of the plant cover that will obstruct sheet flow.

For sheet flow of less than 300 feet, use Manning's kinematic solution (Overtop and Meadows 1976) to compute T_t:

$$T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5} s^{0.4}} \qquad \text{[eq. 3-3]}$$

where:

T_t = travel time (hr),
n = Manning's roughness coefficient (table 3-1)
L = flow length (ft)
P_2 = 2-year, 24-hour rainfall (in)
s = slope of hydraulic grade line (land slope, ft/ft)

This simplified form of the Manning's kinematic solution is based on the following: (1) shallow steady uniform flow, (2) constant intensity of rainfall excess (that part of a rain available for runoff), (3) rainfall duration of 24 hours, and (4) minor effect of infiltration on travel time. Rainfall depth can be obtained from appendix B.

Shallow concentrated flow

After a maximum of 300 feet, sheet flow usually becomes shallow concentrated flow. The average velocity for this flow can be determined from figure 3-1, in which average velocity is a function of watercourse slope and type of channel. For slopes less than 0.005 ft/ft, use equations given in appendix F for figure 3-1. Tillage can affect the direction of shallow concentrated flow. Flow may not always be directly down the watershed slope if tillage runs across the slope.

After determining average velocity in figure 3-1, use equation 3-1 to estimate travel time for the shallow concentrated flow segment.

Open channels

Open channels are assumed to begin where surveyed cross section information has been obtained, where channels are visible on aerial photographs, or where blue lines (indicating streams) appear on United States Geological Survey (USGS) quadrangle sheets. Manning's equation or water surface profile information can be used to estimate average flow velocity. Average flow velocity is usually determined for bankfull elevation.

Manning's equation is:

$$V = \frac{1.49 r^{\frac{2}{3}} s^{\frac{1}{2}}}{n} \qquad \text{[eq. 3-4]}$$

where:

V = average velocity (ft/s)
r = hydraulic radius (ft) and is equal to a/p_w
a = cross sectional flow area (ft^2)
p_w = wetted perimeter (ft)
s = slope of the hydraulic grade line (channel slope, ft/ft)
n = Manning's roughness coefficient for open channel flow.

Manning's n values for open channel flow can be obtained from standard textbooks such as Chow (1959) or Linsley et al. (1982). After average velocity is computed using equation 3-4, T_t for the channel segment can be estimated using equation 3-1.

Reservoirs or lakes

Sometimes it is necessary to estimate the velocity of flow through a reservoir or lake at the outlet of a watershed. This travel time is normally very small and can be assumed as zero.

Limitations

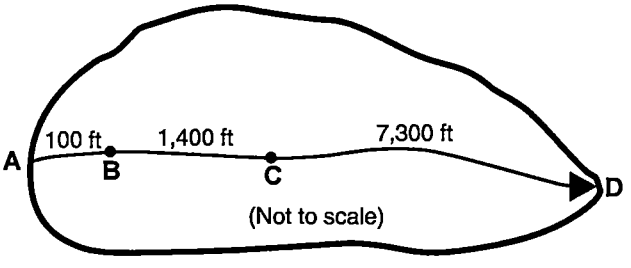
- Manning's kinematic solution should not be used for sheet flow longer than 300 feet. Equation 3-3 was developed for use with the four standard rainfall intensity-duration relationships.
- In watersheds with storm sewers, carefully identify the appropriate hydraulic flow path to estimate T_c. Storm sewers generally handle only a small portion of a large event. The rest of the peak flow travels by streets, lawns, and so on, to the outlet. Consult a standard hydraulics textbook to determine average velocity in pipes for either pressure or nonpressure flow.
- The minimum T_c used in TR-55 is 0.1 hour.
- A culvert or bridge can act as a reservoir outlet if there is significant storage behind it. The procedures in TR-55 can be used to determine the peak flow upstream of the culvert. Detailed storage routing procedures should be used to determine the outflow through the culvert.

Example 3-1

The sketch below shows a watershed in Dyer County, northwestern Tennessee. The problem is to compute T_c at the outlet of the watershed (point D). The 2-year 24-hour rainfall depth is 3.6 inches. All three types of flow occur from the hydraulically most distant point (A) to the point of interest (D). To compute T_c, first determine T_t for each segment from the following information:

Segment AB: Sheet flow; dense grass; slope (s) = 0.01 ft/ft; and length (L) = 100 ft. Segment BC: Shallow concentrated flow; unpaved; s = 0.01 ft/ft; and L = 1,400 ft. Segment CD: Channel flow; Manning's n = .05; flow area (a) = 27 ft^2; wetted perimeter (p_w) = 28.2 ft; s = 0.005 ft/ft; and L = 7,300 ft.

See figure 3-2 for the computations made on worksheet 3.



Area 1 - Existing

Storm: 25Yr 24Hr

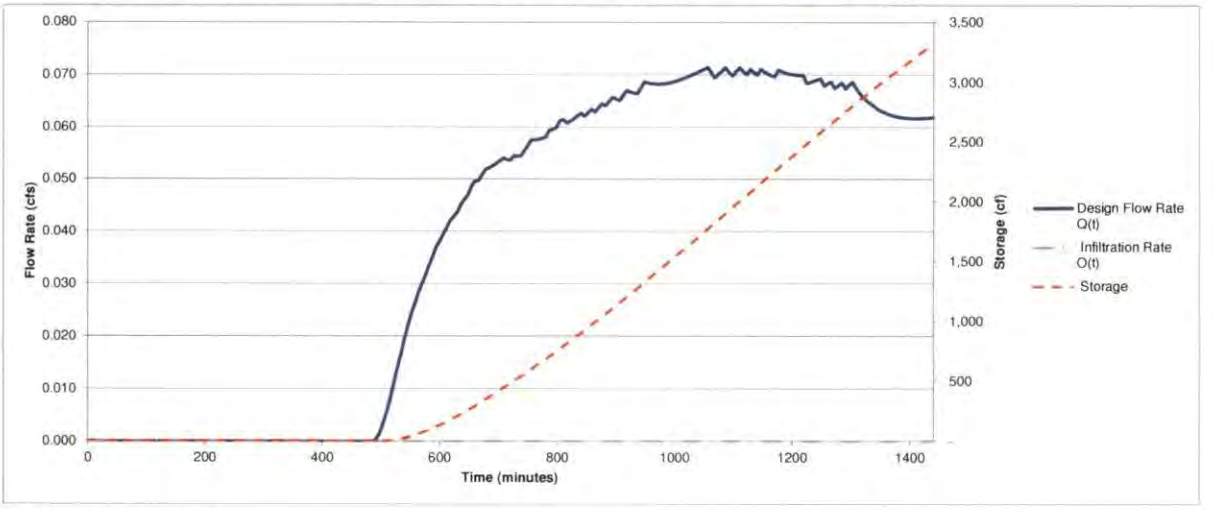
SCS Type 1A Storm Hyetograph Values
Santa Barbara Urban Hydrograph Method

Drainage Basin Area, A =	5.30	acres	Abstract Runoff Value, S =	(1000/CN) - 10	
Total Rainfall, P25yr24hr =	1.6	inches	Runoff Curve Number, CN =	per Table 4.5.2	
Time Increment, dt =	6	minutes	Routing Constant, w =	dt/(2*Tc + dt)	
Time of Concentration, Tc =	49.3	minutes	w =	0.057	
Total Infiltration Rate =	-	cfs			

Summary

Peak Design Flow =	0.071 cfs
Required Storage =	3,322 cf
Peak Hour Runoff =	254 cf

Pervious Area:	A_{perv}=	5.30	acres	CN_{perv} =	74	S_{perv} =	3.51	$0.2*S_{perv}$ = 0.70
Impervious Area:	A_{imp}=	0.00	acres	CN_{imp} =	98	S_{imp} =	0.20	$0.2*S_{imp}$ = 0.04



Column Description and Formula

1 Time Step or Increment, t
2 Elapsed Time (minutes)
3 Rainfall Distribution, Type 1A Storm
4 Incremental Rainfall, P(t) = Column 3 * P
5 Accumulated Rainfall, P = Accumulated Sum of Column 4
6 Accumulated Runoff Depth Pervious Area — If $P \le 0.2*S_{perv}$, then = 0; otherwise, If $P > 0.2*S_{perv}$, then = $(P - 0.2*S_{perv})^2/(P + 0.8*S_{perv})$
7 Incremental Runoff Depth, $D_{perv}(t)$ = Column 6 of present step - Column 6 of prevous step
8 Accumulated Runoff Depth Impervious Area — If $P \le 0.2S_{imp}$, then = 0; otherwise, If $P > 0.2S_{imp}$, then = $(P - 0.2*S_{imp})^2/(P + 0.8*S_{imp})$
9 Incremental Runoff Depth, $D_{imp}(t)$ = Column 7 of present step - Column 7 of prevous step
10 Total Runoff Depth, $D(t) = (A_{perv}/A)*D_{perv}(t) + (A_{imp}/A)- D_{imp}(t)$
11 Instantaneaous Hydrograph Flow Rate, I(t) = 60.5*D(t) * A/dt
12 Design Flow Rate, Q(t+1) = Q(t) + w*[I(t) + I(t+1) - 2*Q(t)]
13 Accumulated Runoff = Q(t)*dt*60 sec/min + Column 13 of previous step
14 Infiltration Rate = (Ksat/(12* 3600)) * AI
15 Change in Storage = dt * { [(I(t)+I(t-1))/2] - [(O(t)+O(t-1))/2]}
16 Storage = Storage from previous step plus change in storage

Area 1 - Existing

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
					Pervious Area		Impervious Area								
Time Increment t	Elapsed Time	Rainfall Distr.	Incremental Rainfall P(t)	Accumulated Rainfall P	Accumulated Runoff	Incremental Runoff $D_{perv}(t)$	Accumulated Runoff	Incremental Runoff $D_{imp}(t)$	Total Runoff D(t)	Instant Flow Rate I(t)	Design Flow Rate Q(t)	Accumulated Runoff	Infiltration Rate O(t)	Change in Storage	Storage
	(minutes)	(fraction)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(cfs)	(cfs)	(cf)	(cfs)	(cf)	(cf)
0	0		-	-	-	-	-	-	-	-	-	-	-	-	-
1	6	0.0020	0.003	0.003	-	-	-	-	-	-	-	-	-	-	-
2	12	0.0020	0.003	0.006	-	-	-	-	-	-	-	-	-	-	-
3	18	0.0020	0.003	0.010	-	-	-	-	-	-	-	-	-	-	-
4	24	0.0020	0.003	0.013	-	-	-	-	-	-	-	-	-	-	-
5	30	0.0020	0.003	0.016	-	-	-	-	-	-	-	-	-	-	-
6	36	0.0020	0.003	0.019	-	-	-	-	-	-	-	-	-	-	-
7	42	0.0020	0.003	0.022	-	-	-	-	-	-	-	-	-	-	-
8	48	0.0020	0.003	0.026	-	-	-	-	-	-	-	-	-	-	-
9	54	0.0020	0.003	0.029	-	-	-	-	-	-	-	-	-	-	-
10	60	0.0020	0.003	0.032	-	-	-	-	-	-	-	-	-	-	-
11	66	0.0030	0.005	0.037	-	-	-	-	-	-	-	-	-	-	-
12	72	0.0030	0.005	0.042	-	-	0.000	0.000	-	-	-	-	-	-	-
13	78	0.0030	0.005	0.046	-	-	0.000	0.000	-	-	-	-	-	-	-
14	84	0.0030	0.005	0.051	-	-	0.001	0.000	-	-	-	-	-	-	-
15	90	0.0030	0.005	0.056	-	-	0.001	0.001	-	-	-	-	-	-	-

Area 1 - Existing

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
					Pervious Area		Impervious Area								
Time Increment t	Elapsed Time	Rainfall Distr.	Incremental Rainfall P(t)	Accumulated Rainfall P	Accumulated Runoff	Incremental Runoff D_{perv} (t)	Accumulated Runoff	Incremental Runoff D_{imp}(t)	Total Runoff D(t)	Instant Flow Rate I(t)	Design Flow Rate Q(t)	Accumulated Runoff	Infiltration Rate O(t)	Change in Storage	Storage
	(minutes)	(fraction)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(cfs)	(cfs)	(cf)	(cfs)	(cf)	(cf)
16	96	0.0030	0.005	0.061	-	-	0.002	0.001	-	-	-	-	-	-	-
17	102	0.0030	0.005	0.066	-	-	0.003	0.001	-	-	-	-	-	-	-
18	108	0.0030	0.005	0.070	-	-	0.004	0.001	-	-	-	-	-	-	-
19	114	0.0030	0.005	0.075	-	-	0.005	0.001	-	-	-	-	-	-	-
20	120	0.0030	0.005	0.080	-	-	0.006	0.001	-	-	-	-	-	-	-
21	126	0.0030	0.005	0.085	-	-	0.008	0.001	-	-	-	-	-	-	-
22	132	0.0030	0.005	0.090	-	-	0.009	0.002	-	-	-	-	-	-	-
23	138	0.0040	0.006	0.096	-	-	0.012	0.002	-	-	-	-	-	-	-
24	144	0.0030	0.005	0.101	-	-	0.014	0.002	-	-	-	-	-	-	-
25	150	0.0030	0.005	0.106	-	-	0.016	0.002	-	-	-	-	-	-	-
26	156	0.0030	0.005	0.110	-	-	0.018	0.002	-	-	-	-	-	-	-
27	162	0.0030	0.005	0.115	-	-	0.020	0.002	-	-	-	-	-	-	-
28	168	0.0040	0.006	0.122	-	-	0.023	0.003	-	-	-	-	-	-	-
29	174	0.0030	0.005	0.126	-	-	0.025	0.002	-	-	-	-	-	-	-
30	180	0.0030	0.005	0.131	-	-	0.028	0.002	-	-	-	-	-	-	-
31	186	0.0030	0.005	0.136	-	-	0.030	0.003	-	-	-	-	-	-	-
32	192	0.0030	0.005	0.141	-	-	0.033	0.003	-	-	-	-	-	-	-
33	198	0.0030	0.005	0.146	-	-	0.036	0.003	-	-	-	-	-	-	-
34	204	0.0040	0.006	0.152	-	-	0.039	0.004	-	-	-	-	-	-	-
35	210	0.0030	0.005	0.157	-	-	0.042	0.003	-	-	-	-	-	-	-
36	216	0.0040	0.006	0.163	-	-	0.046	0.004	-	-	-	-	-	-	-
37	222	0.0040	0.006	0.170	-	-	0.050	0.004	-	-	-	-	-	-	-
38	228	0.0030	0.005	0.174	-	-	0.053	0.003	-	-	-	-	-	-	-
39	234	0.0040	0.006	0.181	-	-	0.057	0.004	-	-	-	-	-	-	-
40	240	0.0040	0.006	0.187	-	-	0.061	0.004	-	-	-	-	-	-	-
41	246	0.0030	0.005	0.192	-	-	0.064	0.003	-	-	-	-	-	-	-
42	252	0.0040	0.006	0.198	-	-	0.069	0.004	-	-	-	-	-	-	-
43	258	0.0040	0.006	0.205	-	-	0.073	0.004	-	-	-	-	-	-	-
44	264	0.0040	0.006	0.211	-	-	0.078	0.004	-	-	-	-	-	-	-
45	270	0.0040	0.006	0.218	-	-	0.082	0.005	-	-	-	-	-	-	-
46	276	0.0040	0.006	0.224	-	-	0.087	0.005	-	-	-	-	-	-	-
47	282	0.0040	0.006	0.230	-	-	0.091	0.005	-	-	-	-	-	-	-
48	288	0.0040	0.006	0.237	-	-	0.096	0.005	-	-	-	-	-	-	-
49	294	0.0050	0.008	0.245	-	-	0.102	0.006	-	-	-	-	-	-	-
50	300	0.0040	0.006	0.251	-	-	0.107	0.005	-	-	-	-	-	-	-
51	306	0.0050	0.008	0.259	-	-	0.113	0.006	-	-	-	-	-	-	-
52	312	0.0040	0.006	0.266	-	-	0.118	0.005	-	-	-	-	-	-	-
53	318	0.0050	0.008	0.274	-	-	0.124	0.006	-	-	-	-	-	-	-
54	324	0.0050	0.008	0.282	-	-	0.130	0.006	-	-	-	-	-	-	-
55	330	0.0050	0.008	0.290	-	-	0.137	0.006	-	-	-	-	-	-	-
56	336	0.0050	0.008	0.298	-	-	0.143	0.006	-	-	-	-	-	-	-
57	342	0.0050	0.008	0.306	-	-	0.150	0.006	-	-	-	-	-	-	-
58	348	0.0050	0.008	0.314	-	-	0.156	0.007	-	-	-	-	-	-	-
59	354	0.0050	0.008	0.322	-	-	0.163	0.007	-	-	-	-	-	-	-
60	360	0.0060	0.010	0.331	-	-	0.171	0.008	-	-	-	-	-	-	-
61	366	0.0060	0.010	0.341	-	-	0.179	0.008	-	-	-	-	-	-	-
62	372	0.0060	0.010	0.350	-	-	0.187	0.008	-	-	-	-	-	-	-
63	378	0.0060	0.010	0.360	-	-	0.195	0.008	-	-	-	-	-	-	-
64	384	0.0070	0.011	0.371	-	-	0.204	0.010	-	-	-	-	-	-	-
65	390	0.0060	0.010	0.381	-	-	0.212	0.008	-	-	-	-	-	-	-
66	396	0.0060	0.010	0.390	-	-	0.221	0.008	-	-	-	-	-	-	-
67	402	0.0060	0.010	0.400	-	-	0.229	0.008	-	-	-	-	-	-	-
68	408	0.0060	0.010	0.410	-	-	0.237	0.008	-	-	-	-	-	-	-
69	414	0.0060	0.010	0.419	-	-	0.246	0.008	-	-	-	-	-	-	-
70	420	0.0070	0.011	0.430	-	-	0.256	0.010	-	-	-	-	-	-	-
71	426	0.0070	0.011	0.442	-	-	0.266	0.010	-	-	-	-	-	-	-
72	432	0.0080	0.013	0.454	-	-	0.277	0.011	-	-	-	-	-	-	-
73	438	0.0080	0.013	0.467	-	-	0.288	0.011	-	-	-	-	-	-	-
74	444	0.0090	0.014	0.482	-	-	0.301	0.013	-	-	-	-	-	-	-
75	450	0.0100	0.016	0.498	-	-	0.316	0.014	-	-	-	-	-	-	-
76	456	0.0210	0.034	0.531	-	-	0.346	0.031	-	-	-	-	-	-	-
77	462	0.0240	0.038	0.570	-	-	0.382	0.035	-	-	-	-	-	-	-
78	468	0.0240	0.038	0.608	-	-	0.417	0.036	-	-	-	-	-	-	-
79	474	0.0240	0.038	0.646	-	-	0.453	0.036	-	-	-	-	-	-	-
80	480	0.0220	0.035	0.682	-	-	0.486	0.033	-	-	-	-	-	-	-
81	486	0.0140	0.022	0.704	0.000	0.000	0.507	0.021	0.000	0.00	0.000	0.0	-	0.00	0
82	492	0.0130	0.021	0.725	0.000	0.000	0.527	0.020	0.000	0.01	0.000	0.2	-	0.08	0
83	498	0.0100	0.016	0.741	0.000	0.000	0.542	0.015	0.000	0.01	0.002	0.7	-	0.37	0
84	504	0.0100	0.016	0.757	0.001	0.000	0.557	0.015	0.000	0.02	0.004	2.0	-	0.93	1
85	510	0.0080	0.013	0.770	0.001	0.000	0.569	0.012	0.000	0.02	0.006	4.1	-	1.67	3
86	516	0.0090	0.014	0.784	0.002	0.001	0.583	0.014	0.001	0.03	0.008	7.0	-	2.50	6
87	522	0.0090	0.014	0.798	0.003	0.001	0.597	0.014	0.001	0.04	0.011	11.1	-	3.49	9
88	528	0.0070	0.011	0.810	0.003	0.001	0.608	0.011	0.001	0.03	0.014	16.1	-	4.53	14
89	534	0.0080	0.013	0.822	0.004	0.001	0.620	0.012	0.001	0.04	0.017	22.1	-	5.51	19
90	540	0.0070	0.011	0.834	0.005	0.001	0.630	0.011	0.001	0.04	0.020	29.1	-	6.51	26
91	546	0.0070	0.011	0.845	0.006	0.001	0.641	0.011	0.001	0.04	0.022	37.1	-	7.49	33
92	552	0.0060	0.010	0.854	0.006	0.001	0.650	0.009	0.001	0.04	0.024	45.9	-	8.38	41
93	558	0.0060	0.010	0.864	0.007	0.001	0.660	0.009	0.001	0.04	0.026	55.4	-	9.15	51

Area 1 - Existing

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
					Pervious Area		Impervious Area								
Time Increment t	Elapsed Time	Rainfall Distr.	Incremental Rainfall P(t)	Accumulated Rainfall P	Accumulated Runoff	Incremental Runoff D_{perv} (t)	Accumulated Runoff	Incremental Runoff D_{imp}(t)	Total Runoff D(t)	Instant Flow Rate I(t)	Design Flow Rate Q(t)	Accumulated Runoff	Infiltration Rate O(t)	Change in Storage	Storage
	(minutes)	(fraction)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(cfs)	(cfs)	(cf)	(cfs)	(cf)	(cf)
94	564	0.0060	0.010	0.874	0.008	0.001	0.669	0.009	0.001	0.05	0.028	65.6	-	9.87	60
95	570	0.0050	0.008	0.882	0.009	0.001	0.677	0.008	0.001	0.04	0.030	76.4	-	10.52	71
96	576	0.0060	0.010	0.891	0.010	0.001	0.686	0.009	0.001	0.05	0.032	87.8	-	11.12	82
97	582	0.0050	0.008	0.899	0.010	0.001	0.694	0.008	0.001	0.04	0.033	99.9	-	11.73	94
98	588	0.0060	0.010	0.909	0.011	0.001	0.703	0.009	0.001	0.05	0.035	112.5	-	12.35	106
99	594	0.0050	0.008	0.917	0.012	0.001	0.710	0.008	0.001	0.05	0.037	125.8	-	12.98	119
100	600	0.0050	0.008	0.925	0.013	0.001	0.718	0.008	0.001	0.05	0.038	139.6	-	13.52	133
101	606	0.0050	0.008	0.933	0.014	0.001	0.726	0.008	0.001	0.05	0.039	153.8	-	13.98	147
102	612	0.0050	0.008	0.941	0.015	0.001	0.734	0.008	0.001	0.05	0.041	168.5	-	14.45	161
103	618	0.0050	0.008	0.949	0.016	0.001	0.741	0.008	0.001	0.05	0.042	183.6	-	14.93	176
104	624	0.0040	0.006	0.955	0.017	0.001	0.748	0.006	0.001	0.04	0.043	199.1	-	15.31	191
105	630	0.0050	0.008	0.963	0.018	0.001	0.755	0.008	0.001	0.06	0.044	214.8	-	15.59	207
106	636	0.0050	0.008	0.971	0.019	0.001	0.763	0.008	0.001	0.06	0.045	231.1	-	16.01	223
107	642	0.0040	0.006	0.978	0.020	0.001	0.769	0.006	0.001	0.05	0.046	247.7	-	16.44	239
108	648	0.0050	0.008	0.986	0.021	0.001	0.777	0.008	0.001	0.06	0.047	264.6	-	16.75	256
109	654	0.0050	0.008	0.994	0.022	0.001	0.785	0.008	0.001	0.06	0.049	282.1	-	17.21	273
110	660	0.0040	0.006	1.000	0.023	0.001	0.791	0.006	0.001	0.05	0.050	299.9	-	17.67	291
111	666	0.0040	0.006	1.006	0.024	0.001	0.797	0.006	0.001	0.05	0.050	317.9	-	17.87	309
112	672	0.0050	0.008	1.014	0.025	0.001	0.805	0.008	0.001	0.07	0.051	336.1	-	18.10	327
113	678	0.0040	0.006	1.021	0.026	0.001	0.811	0.006	0.001	0.05	0.052	354.8	-	18.48	345
114	684	0.0040	0.006	1.027	0.027	0.001	0.817	0.006	0.001	0.05	0.052	373.6	-	18.73	364
115	690	0.0040	0.006	1.034	0.028	0.001	0.824	0.006	0.001	0.06	0.053	392.5	-	18.85	383
116	696	0.0040	0.006	1.040	0.030	0.001	0.830	0.006	0.001	0.06	0.053	411.6	-	19.00	402
117	702	0.0040	0.006	1.046	0.031	0.001	0.836	0.006	0.001	0.06	0.053	430.8	-	19.17	421
118	708	0.0040	0.006	1.053	0.032	0.001	0.842	0.006	0.001	0.06	0.054	450.3	-	19.35	441
119	714	0.0030	0.005	1.058	0.033	0.001	0.847	0.005	0.001	0.04	0.054	469.7	-	19.41	460
120	720	0.0040	0.006	1.064	0.034	0.001	0.853	0.006	0.001	0.06	0.054	489.0	-	19.33	479
121	726	0.0040	0.006	1.070	0.035	0.001	0.859	0.006	0.001	0.06	0.054	508.6	-	19.46	499
122	732	0.0030	0.005	1.075	0.036	0.001	0.864	0.005	0.001	0.05	0.054	528.2	-	19.60	518
123	738	0.0040	0.006	1.082	0.037	0.001	0.870	0.006	0.001	0.06	0.054	547.8	-	19.59	538
124	744	0.0040	0.006	1.088	0.038	0.001	0.876	0.006	0.001	0.06	0.055	567.7	-	19.79	558
125	750	0.0040	0.006	1.094	0.039	0.001	0.883	0.006	0.001	0.06	0.056	588.1	-	20.15	578
126	756	0.0040	0.006	1.101	0.041	0.001	0.889	0.006	0.001	0.07	0.057	608.8	-	20.52	598
127	762	0.0030	0.005	1.106	0.041	0.001	0.894	0.005	0.001	0.05	0.058	629.5	-	20.70	619
128	768	0.0040	0.006	1.112	0.043	0.001	0.900	0.006	0.001	0.07	0.058	650.2	-	20.73	640
129	774	0.0030	0.005	1.117	0.044	0.001	0.904	0.005	0.001	0.05	0.058	671.0	-	20.78	661
130	780	0.0040	0.006	1.123	0.045	0.001	0.911	0.006	0.001	0.07	0.058	691.9	-	20.86	681
131	786	0.0040	0.006	1.130	0.046	0.001	0.917	0.006	0.001	0.07	0.059	713.3	-	21.13	703
132	792	0.0030	0.005	1.134	0.047	0.001	0.922	0.005	0.001	0.05	0.060	734.7	-	21.40	724
133	798	0.0040	0.006	1.141	0.049	0.001	0.928	0.006	0.001	0.07	0.060	756.3	-	21.50	746
134	804	0.0040	0.006	1.147	0.050	0.001	0.934	0.006	0.001	0.07	0.061	778.3	-	21.79	767
135	810	0.0030	0.005	1.152	0.051	0.001	0.939	0.005	0.001	0.05	0.061	800.5	-	22.08	789
136	816	0.0030	0.005	1.157	0.052	0.001	0.943	0.005	0.001	0.06	0.061	822.3	-	21.99	811
137	822	0.0040	0.006	1.163	0.053	0.001	0.950	0.006	0.001	0.07	0.061	844.3	-	21.94	833
138	828	0.0030	0.005	1.168	0.054	0.001	0.954	0.005	0.001	0.06	0.062	866.5	-	22.11	855
139	834	0.0040	0.006	1.174	0.056	0.001	0.961	0.006	0.001	0.08	0.062	888.9	-	22.28	878
140	840	0.0030	0.005	1.179	0.057	0.001	0.965	0.005	0.001	0.06	0.063	911.5	-	22.47	900
141	846	0.0030	0.005	1.184	0.058	0.001	0.970	0.005	0.001	0.06	0.062	933.8	-	22.46	923
142	852	0.0040	0.006	1.190	0.059	0.001	0.976	0.006	0.001	0.08	0.063	956.4	-	22.47	945
143	858	0.0030	0.005	1.195	0.061	0.001	0.981	0.005	0.001	0.06	0.063	979.2	-	22.71	968
144	864	0.0030	0.005	1.200	0.062	0.001	0.986	0.005	0.001	0.06	0.063	1,001.9	-	22.74	991
145	870	0.0040	0.006	1.206	0.063	0.001	0.992	0.006	0.001	0.08	0.064	1,024.8	-	22.80	1,013
146	876	0.0030	0.005	1.211	0.064	0.001	0.997	0.005	0.001	0.06	0.064	1,048.0	-	23.08	1,036
147	882	0.0030	0.005	1.216	0.065	0.001	1.001	0.005	0.001	0.06	0.064	1,071.1	-	23.14	1,060
148	888	0.0040	0.006	1.222	0.067	0.002	1.008	0.006	0.002	0.08	0.065	1,094.5	-	23.22	1,083
149	894	0.0030	0.005	1.227	0.068	0.001	1.012	0.005	0.001	0.06	0.066	1,118.1	-	23.52	1,106
150	900	0.0030	0.005	1.232	0.069	0.001	1.017	0.005	0.001	0.06	0.065	1,141.7	-	23.60	1,130
151	906	0.0030	0.005	1.237	0.070	0.001	1.022	0.005	0.001	0.06	0.065	1,165.1	-	23.48	1,153
152	912	0.0040	0.006	1.243	0.072	0.002	1.028	0.006	0.002	0.08	0.066	1,188.9	-	23.61	1,177
153	918	0.0030	0.005	1.248	0.073	0.001	1.033	0.005	0.001	0.06	0.067	1,213.0	-	23.96	1,201
154	924	0.0030	0.005	1.253	0.074	0.001	1.037	0.005	0.001	0.06	0.067	1,237.1	-	24.08	1,225
155	930	0.0030	0.005	1.258	0.076	0.001	1.042	0.005	0.001	0.07	0.067	1,261.0	-	23.99	1,249
156	936	0.0030	0.005	1.262	0.077	0.001	1.047	0.005	0.001	0.07	0.066	1,284.9	-	23.92	1,273
157	942	0.0040	0.006	1.269	0.079	0.002	1.053	0.006	0.002	0.09	0.068	1,309.2	-	24.11	1,297
158	948	0.0030	0.005	1.274	0.080	0.001	1.058	0.005	0.001	0.07	0.069	1,333.9	-	24.52	1,322
159	954	0.0030	0.005	1.278	0.081	0.001	1.062	0.005	0.001	0.07	0.068	1,358.6	-	24.68	1,346
160	960	0.0030	0.005	1.283	0.082	0.001	1.067	0.005	0.001	0.07	0.068	1,383.2	-	24.62	1,371
161	966	0.0030	0.005	1.288	0.084	0.001	1.072	0.005	0.001	0.07	0.068	1,407.7	-	24.58	1,395
162	972	0.0030	0.005	1.293	0.085	0.001	1.077	0.005	0.001	0.07	0.068	1,432.3	-	24.56	1,420
163	978	0.0030	0.005	1.298	0.086	0.001	1.081	0.005	0.001	0.07	0.068	1,456.9	-	24.56	1,445
164	984	0.0030	0.005	1.302	0.087	0.001	1.086	0.005	0.001	0.07	0.068	1,481.5	-	24.59	1,469
165	990	0.0030	0.005	1.307	0.089	0.001	1.091	0.005	0.001	0.07	0.068	1,506.1	-	24.62	1,494
166	996	0.0030	0.005	1.312	0.090	0.001	1.095	0.005	0.001	0.07	0.069	1,530.8	-	24.67	1,518
167	1002	0.0030	0.005	1.317	0.091	0.001	1.100	0.005	0.001	0.07	0.069	1,555.6	-	24.74	1,543
168	1008	0.0030	0.005	1.322	0.093	0.001	1.105	0.005	0.001	0.07	0.069	1,580.4	-	24.81	1,568
169	1014	0.0030	0.005	1.326	0.094	0.001	1.109	0.005	0.001	0.07	0.069	1,605.4	-	24.89	1,593
170	1020	0.0030	0.005	1.331	0.095	0.001	1.114	0.005	0.001	0.07	0.070	1,630.4	-	24.98	1,618
171	1026	0.0030	0.005	1.336	0.097	0.001	1.119	0.005	0.001	0.07	0.070	1,655.5	-	25.08	1,643

Area 1 - Existing

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
					Pervious Area		Impervious Area								
Time Increment t	Elapsed Time	Rainfall Distr.	Incremental Rainfall P(t)	Accumulated Rainfall P	Accumulated Runoff	Incremental Runoff D_{perv} (t)	Accumulated Runoff	Incremental Runoff D_{imp}(t)	Total Runoff D(t)	Instant Flow Rate I(t)	Design Flow Rate Q(t)	Accumulated Runoff	Infiltration Rate O(t)	Change in Storage	Storage
	(minutes)	(fraction)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(cfs)	(cfs)	(cf)	(cfs)	(cf)	(cf)
172	1032	0.0030	0.005	1.341	0.098	0.001	1.124	0.005	0.001	0.07	0.070	1,680.8	-	25.19	1,668
173	1038	0.0030	0.005	1.346	0.099	0.001	1.128	0.005	0.001	0.07	0.070	1,706.1	-	25.30	1,693
174	1044	0.0030	0.005	1.350	0.101	0.001	1.133	0.005	0.001	0.07	0.071	1,731.6	-	25.41	1,719
175	1050	0.0030	0.005	1.355	0.102	0.001	1.138	0.005	0.001	0.07	0.071	1,757.2	-	25.53	1,744
176	1056	0.0030	0.005	1.360	0.104	0.001	1.142	0.005	0.001	0.07	0.071	1,782.9	-	25.66	1,770
177	1062	0.0020	0.003	1.363	0.105	0.001	1.146	0.003	0.001	0.05	0.070	1,808.2	-	25.53	1,796
178	1068	0.0030	0.005	1.368	0.106	0.001	1.150	0.005	0.001	0.08	0.069	1,833.3	-	25.17	1,821
179	1074	0.0030	0.005	1.373	0.107	0.001	1.155	0.005	0.001	0.08	0.070	1,858.5	-	25.12	1,846
180	1080	0.0030	0.005	1.378	0.109	0.001	1.160	0.005	0.001	0.08	0.071	1,884.0	-	25.36	1,871
181	1086	0.0030	0.005	1.382	0.110	0.001	1.164	0.005	0.001	0.08	0.071	1,909.7	-	25.58	1,897
182	1092	0.0020	0.003	1.386	0.111	0.001	1.168	0.003	0.001	0.05	0.070	1,935.0	-	25.53	1,922
183	1098	0.0030	0.005	1.390	0.113	0.001	1.172	0.005	0.001	0.08	0.070	1,960.1	-	25.24	1,948
184	1104	0.0030	0.005	1.395	0.114	0.001	1.177	0.005	0.001	0.08	0.071	1,985.5	-	25.26	1,973
185	1110	0.0030	0.005	1.400	0.115	0.001	1.182	0.005	0.001	0.08	0.071	2,011.3	-	25.56	1,998
186	1116	0.0020	0.003	1.403	0.116	0.001	1.185	0.003	0.001	0.05	0.071	2,036.7	-	25.57	2,024
187	1122	0.0030	0.005	1.408	0.118	0.001	1.190	0.005	0.001	0.08	0.070	2,061.9	-	25.32	2,049
188	1128	0.0030	0.005	1.413	0.119	0.001	1.194	0.005	0.001	0.08	0.071	2,087.5	-	25.39	2,075
189	1134	0.0020	0.003	1.416	0.120	0.001	1.197	0.003	0.001	0.05	0.070	2,112.8	-	25.46	2,100
190	1140	0.0030	0.005	1.421	0.122	0.001	1.202	0.005	0.001	0.08	0.070	2,138.0	-	25.27	2,125
191	1146	0.0030	0.005	1.426	0.123	0.001	1.207	0.005	0.001	0.08	0.071	2,163.6	-	25.38	2,151
192	1152	0.0020	0.003	1.429	0.124	0.001	1.210	0.003	0.001	0.05	0.071	2,189.0	-	25.49	2,176
193	1158	0.0030	0.005	1.434	0.126	0.002	1.215	0.005	0.002	0.08	0.070	2,214.3	-	25.33	2,202
194	1164	0.0020	0.003	1.437	0.127	0.001	1.218	0.003	0.001	0.05	0.070	2,239.4	-	25.20	2,227
195	1170	0.0030	0.005	1.442	0.128	0.002	1.223	0.005	0.002	0.08	0.070	2,264.4	-	25.09	2,252
196	1176	0.0030	0.005	1.446	0.130	0.002	1.227	0.005	0.002	0.08	0.071	2,290.0	-	25.29	2,277
197	1182	0.0020	0.003	1.450	0.131	0.001	1.231	0.003	0.001	0.05	0.071	2,315.4	-	25.48	2,303
198	1188	0.0030	0.005	1.454	0.132	0.002	1.235	0.005	0.002	0.08	0.070	2,340.7	-	25.38	2,328
199	1194	0.0020	0.003	1.458	0.134	0.001	1.238	0.003	0.001	0.06	0.070	2,366.0	-	25.30	2,353
200	1200	0.0030	0.005	1.462	0.135	0.002	1.243	0.005	0.002	0.08	0.070	2,391.2	-	25.24	2,379
201	1206	0.0020	0.003	1.466	0.136	0.001	1.246	0.003	0.001	0.06	0.070	2,416.4	-	25.20	2,404
202	1212	0.0030	0.005	1.470	0.138	0.002	1.251	0.005	0.002	0.08	0.070	2,441.6	-	25.18	2,429
203	1218	0.0020	0.003	1.474	0.139	0.001	1.254	0.003	0.001	0.06	0.070	2,466.8	-	25.17	2,454
204	1224	0.0020	0.003	1.477	0.140	0.001	1.257	0.003	0.001	0.06	0.068	2,491.3	-	24.88	2,479
205	1230	0.0030	0.005	1.482	0.141	0.002	1.262	0.005	0.002	0.08	0.069	2,516.0	-	24.64	2,504
206	1236	0.0020	0.003	1.485	0.142	0.001	1.265	0.003	0.001	0.06	0.069	2,540.8	-	24.72	2,528
207	1242	0.0030	0.005	1.490	0.144	0.002	1.270	0.005	0.002	0.09	0.069	2,565.6	-	24.80	2,553
208	1248	0.0020	0.003	1.493	0.145	0.001	1.273	0.003	0.001	0.06	0.069	2,590.6	-	24.89	2,578
209	1254	0.0020	0.003	1.496	0.146	0.001	1.276	0.003	0.001	0.06	0.068	2,615.0	-	24.68	2,603
210	1260	0.0030	0.005	1.501	0.148	0.002	1.281	0.005	0.002	0.09	0.068	2,639.6	-	24.51	2,627
211	1266	0.0020	0.003	1.504	0.149	0.001	1.284	0.003	0.001	0.06	0.069	2,664.3	-	24.66	2,652
212	1272	0.0020	0.003	1.507	0.150	0.001	1.287	0.003	0.001	0.06	0.067	2,688.6	-	24.50	2,676
213	1278	0.0030	0.005	1.512	0.152	0.002	1.292	0.005	0.002	0.09	0.068	2,713.1	-	24.38	2,701
214	1284	0.0020	0.003	1.515	0.153	0.001	1.295	0.003	0.001	0.06	0.069	2,737.7	-	24.57	2,725
215	1290	0.0020	0.003	1.518	0.154	0.001	1.298	0.003	0.001	0.06	0.067	2,762.0	-	24.45	2,750
216	1296	0.0030	0.005	1.523	0.155	0.002	1.303	0.005	0.002	0.09	0.068	2,786.4	-	24.36	2,774
217	1302	0.0020	0.003	1.526	0.156	0.001	1.306	0.003	0.001	0.06	0.069	2,811.1	-	24.59	2,799
218	1308	0.0020	0.003	1.530	0.158	0.001	1.309	0.003	0.001	0.06	0.067	2,835.4	-	24.50	2,823
219	1314	0.0020	0.003	1.533	0.159	0.001	1.312	0.003	0.001	0.06	0.067	2,859.4	-	24.12	2,847
220	1320	0.0020	0.003	1.536	0.160	0.001	1.316	0.003	0.001	0.06	0.066	2,883.0	-	23.79	2,871
221	1326	0.0021	0.003	1.539	0.161	0.001	1.319	0.003	0.001	0.06	0.065	2,906.5	-	23.54	2,895
222	1332	0.0020	0.003	1.543	0.162	0.001	1.322	0.003	0.001	0.06	0.065	2,929.7	-	23.35	2,918
223	1338	0.0020	0.003	1.546	0.163	0.001	1.325	0.003	0.001	0.06	0.064	2,952.8	-	23.17	2,941
224	1344	0.0020	0.003	1.549	0.164	0.001	1.328	0.003	0.001	0.06	0.064	2,975.7	-	22.98	2,964
225	1350	0.0020	0.003	1.552	0.165	0.001	1.332	0.003	0.001	0.06	0.063	2,998.4	-	22.81	2,987
226	1356	0.0020	0.003	1.555	0.167	0.001	1.335	0.003	0.001	0.06	0.063	3,021.0	-	22.68	3,010
227	1362	0.0020	0.003	1.559	0.168	0.001	1.338	0.003	0.001	0.06	0.063	3,043.5	-	22.56	3,032
228	1368	0.0020	0.003	1.562	0.169	0.001	1.341	0.003	0.001	0.06	0.062	3,066.0	-	22.47	3,055
229	1374	0.0020	0.003	1.565	0.170	0.001	1.344	0.003	0.001	0.06	0.062	3,088.3	-	22.39	3,077
230	1380	0.0020	0.003	1.568	0.171	0.001	1.347	0.003	0.001	0.06	0.062	3,110.6	-	22.33	3,099
231	1386	0.0020	0.003	1.571	0.172	0.001	1.350	0.003	0.001	0.06	0.062	3,132.9	-	22.29	3,122
232	1392	0.0020	0.003	1.575	0.173	0.001	1.354	0.003	0.001	0.06	0.062	3,155.1	-	22.25	3,144
233	1398	0.0020	0.003	1.578	0.174	0.001	1.357	0.003	0.001	0.06	0.062	3,177.3	-	22.23	3,166
234	1404	0.0020	0.003	1.581	0.176	0.001	1.360	0.003	0.001	0.06	0.062	3,199.6	-	22.21	3,188
235	1410	0.0020	0.003	1.584	0.177	0.001	1.363	0.003	0.001	0.06	0.062	3,221.8	-	22.20	3,211
236	1416	0.0020	0.003	1.587	0.178	0.001	1.366	0.003	0.001	0.06	0.062	3,244.0	-	22.20	3,233
237	1422	0.0020	0.003	1.591	0.179	0.001	1.369	0.003	0.001	0.06	0.062	3,266.2	-	22.21	3,255
238	1428	0.0020	0.003	1.594	0.180	0.001	1.373	0.003	0.001	0.06	0.062	3,288.4	-	22.22	3,277
239	1434	0.0020	0.003	1.597	0.181	0.001	1.376	0.003	0.001	0.06	0.062	3,310.7	-	22.24	3,300
240	1440	0.0020	0.003	1.600	0.183	0.001	1.379	0.003	0.001	0.06	0.062	3,332.9	-	22.26	3,322

Area 1 - Proposed

Storm: 25Yr 24Hr

SCS Type 1A Storm Hyetograph Values

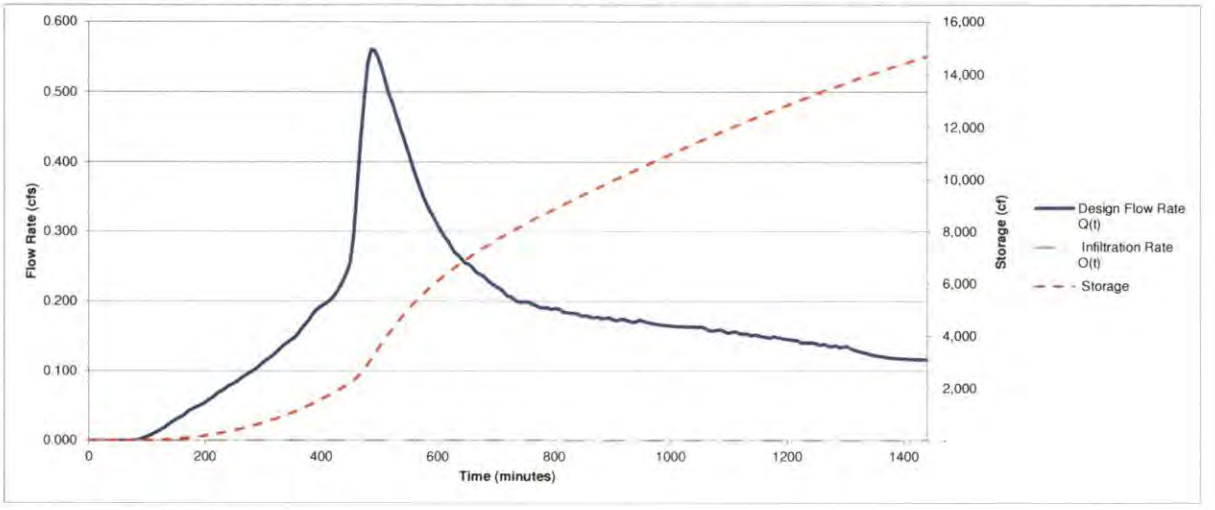
Santa Barbara Urban Hydrograph Method

Drainage Basin Area, A =	5.30	acres	Abstract Runoff Value, S =	(1000/CN) - 10	
Total Rainfall, P25yr24hr =	1.6	inches	Runoff Curve Number, CN =	per Table 4.5.2	
Time increment, dt =	6	minutes	Routing Constant, w =	dt/(2*Tc + dt)	
Time of Concentration, Tc =	49.3	minutes	w =	0.057	
Total Infiltration Rate =	-	cfs			

Summary

Peak Design Flow =	0.561	cfs
Required Storage =	14,668	cf
Peak Hour Runoff =	1,871	cf

Pervious Area:	A_{perv}=	2.65	acres	CN_{perv} =	74	S_{perv} =	3.51	$0.2*S_{perv}$ =	0.70
Impervious Area:	A_{imp}=	2.65	acres	CN_{imp} =	98	S_{imp} =	0.20	$0.2*S_{imp}$ =	0.04



Column Description and Formula

1 Time Step or Increment, t
2 Elapsed Time (minutes)
3 Rainfall Distribution, Type 1A Storm from Table 4.2.2
4 Incremental Rainfall, P(t) = Column 3 * P
5 Accumulated Rainfall, P = Accumulated Sum of Column 4
6 Accumulated Runoff Depth Pervious Area — If $P \le 0.2*S_{perv}$, then = 0; otherwise, If $P > 0.2*S_{perv}$, then = $(P - 0.2*S_{perv})^2/(P + 0.8*S_{perv})$
7 Incremental Runoff Depth, $D_{perv}(t)$ = Column 6 of present step - Column 6 of prevous step
8 Accumulated Runoff Depth Impervious Area — If $P \le 0.2S_{imp}$, then = 0; otherwise, If $P > 0.2S_{imp}$, then = $(P - 0.2*S_{imp})^2/(P + 0.8*S_{imp})$
9 Incremental Runoff Depth, $D_{imp}(t)$ = Column 7 of present step - Column 7 of prevous step
10 Total Runoff Depth, $D(t) = (A_{perv}/A)*D_{perv}(t) + (A_{imp}/A)- D_{imp}(t)$
11 Instantaneaous Hydrograph Flow Rate, $I(t) = 60.5*D(t) * A/dt$
12 Design Flow Rate, $Q(t+1) = Q(t) + w*[I(t) + I(t+1) - 2*Q(t)]$
13 Accumulated Runoff = Q(t)*dt*60 sec/min + Column 13 of previous step
14 Infiltration Rate = (Ksat/(12* 3600)) * AI
15 Change in Storage = dt * { [(I(t)+I(t-1))/2] - [(O(t)+O(t-1))/2]}
16 Storage = Storage from previous step plus change in storage

Area 1 - Proposed

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
					Pervious Area		Impervious Area								
Time Increment t	Elapsed Time	Rainfall Distr.	Incremental Rainfall P(t)	Accumulated Rainfall P	Accumulated Runoff	Incremental Runoff D_{perv} (t)	Accumulated Runoff	Incremental Runoff D_{imp}(t)	Total Runoff D(t)	Instant Flow Rate I(t)	Design Flow Rate Q(t)	Accumulated Runoff	Infiltration Rate O(t)	Change in Storage	Storage
	(minutes)	(fraction)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(cfs)	(cfs)	(cf)	(cfs)	(cf)	(cf)
0	0		-	-	-	-	-	-	-	-	-	-	-	-	-
1	6	0.0020	0.003	0.003	-	-	-	-	-	-	-	-	-	-	-
2	12	0.0020	0.003	0.006	-	-	-	-	-	-	-	-	-	-	-
3	18	0.0020	0.003	0.010	-	-	-	-	-	-	-	-	-	-	-
4	24	0.0020	0.003	0.013	-	-	-	-	-	-	-	-	-	-	-
5	30	0.0020	0.003	0.016	-	-	-	-	-	-	-	-	-	-	-
6	36	0.0020	0.003	0.019	-	-	-	-	-	-	-	-	-	-	-
7	42	0.0020	0.003	0.022	-	-	-	-	-	-	-	-	-	-	-
8	48	0.0020	0.003	0.026	-	-	-	-	-	-	-	-	-	-	-
9	54	0.0020	0.003	0.029	-	-	-	-	-	-	-	-	-	-	-
10	60	0.0020	0.003	0.032	-	-	-	-	-	-	-	-	-	-	-
11	66	0.0030	0.005	0.037	-	-	-	-	-	-	-	-	-	-	-
12	72	0.0030	0.005	0.042	-	-	0.000	0.000	0.000	0.00	0.000	0.0	-	0.00	0
13	78	0.0030	0.005	0.046	-	-	0.000	0.000	0.000	0.00	0.000	0.1	-	0.04	0
14	84	0.0030	0.005	0.051	-	-	0.001	0.000	0.000	0.01	0.001	0.4	-	0.22	0
15	90	0.0030	0.005	0.056	-	-	0.001	0.001	0.000	0.01	0.002	1.2	-	0.58	1

Area 1 - Proposed

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
					Pervious Area		Impervious Area								
Time Increment t	Elapsed Time	Rainfall Distr.	Incremental Rainfall P(t)	Accumulated Rainfall P	Accumulated Runoff	Incremental Runoff D_{perv} (t)	Accumulated Runoff	Incremental Runoff D_{imp}(t)	Total Runoff D(t)	Instant Flow Rate I(t)	Design Flow Rate Q(t)	Accumulated Runoff	Infiltration Rate O(t)	Change in Storage	Storage
	(minutes)	(fraction)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(cfs)	(cfs)	(cf)	(cfs)	(cf)	(cf)
16	96	0.0030	0.005	0.061	-	-	0.002	0.001	0.000	0.02	0.004	2.7	-	1.12	2
17	102	0.0030	0.005	0.066	-	-	0.003	0.001	0.000	0.02	0.006	4.8	-	1.79	4
18	108	0.0030	0.005	0.070	-	-	0.004	0.001	0.001	0.03	0.008	7.8	-	2.58	6
19	114	0.0030	0.005	0.075	-	-	0.005	0.001	0.001	0.03	0.011	11.7	-	3.46	10
20	120	0.0030	0.005	0.080	-	-	0.006	0.001	0.001	0.04	0.014	16.6	-	4.40	14
21	126	0.0030	0.005	0.085	-	-	0.008	0.001	0.001	0.04	0.016	22.5	-	5.39	20
22	132	0.0030	0.005	0.090	-	-	0.009	0.002	0.001	0.04	0.019	29.4	-	6.41	26
23	138	0.0040	0.006	0.096	-	-	0.012	0.002	0.001	0.06	0.023	37.8	-	7.62	34
24	144	0.0030	0.005	0.101	-	-	0.014	0.002	0.001	0.05	0.027	47.4	-	9.00	43
25	150	0.0030	0.005	0.106	-	-	0.016	0.002	0.001	0.05	0.030	58.2	-	10.20	53
26	156	0.0030	0.005	0.110	-	-	0.018	0.002	0.001	0.06	0.033	69.9	-	11.22	64
27	162	0.0030	0.005	0.115	-	-	0.020	0.002	0.001	0.06	0.035	82.6	-	12.23	76
28	168	0.0040	0.006	0.122	-	-	0.023	0.003	0.002	0.08	0.039	96.8	-	13.45	90
29	174	0.0030	0.005	0.126	-	-	0.025	0.002	0.001	0.06	0.043	112.3	-	14.84	105
30	180	0.0030	0.005	0.131	-	-	0.028	0.002	0.001	0.07	0.046	128.7	-	15.97	121
31	186	0.0030	0.005	0.136	-	-	0.030	0.003	0.001	0.07	0.048	146.0	-	16.85	137
32	192	0.0030	0.005	0.141	-	-	0.033	0.003	0.001	0.07	0.050	164.2	-	17.71	155
33	198	0.0030	0.005	0.146	-	-	0.036	0.003	0.001	0.07	0.053	183.1	-	18.56	174
34	204	0.0040	0.006	0.152	-	-	0.039	0.004	0.002	0.10	0.056	203.4	-	19.63	193
35	210	0.0030	0.005	0.157	-	-	0.042	0.003	0.001	0.08	0.060	225.0	-	20.92	214
36	216	0.0040	0.006	0.163	-	-	0.046	0.004	0.002	0.10	0.063	247.7	-	22.15	236
37	222	0.0040	0.006	0.170	-	-	0.050	0.004	0.002	0.11	0.068	272.2	-	23.61	260
38	228	0.0030	0.005	0.174	-	-	0.053	0.003	0.002	0.08	0.071	297.7	-	24.98	285
39	234	0.0040	0.006	0.181	-	-	0.057	0.004	0.002	0.11	0.074	324.2	-	26.00	311
40	240	0.0040	0.006	0.187	-	-	0.061	0.004	0.002	0.11	0.078	352.2	-	27.28	338
41	246	0.0030	0.005	0.192	-	-	0.064	0.003	0.002	0.09	0.080	381.2	-	28.48	367
42	252	0.0040	0.006	0.198	-	-	0.069	0.004	0.002	0.12	0.083	410.9	-	29.33	396
43	258	0.0040	0.006	0.205	-	-	0.073	0.004	0.002	0.12	0.087	442.1	-	30.45	426
44	264	0.0040	0.006	0.211	-	-	0.078	0.004	0.002	0.12	0.090	474.5	-	31.82	458
45	270	0.0040	0.006	0.218	-	-	0.082	0.005	0.002	0.12	0.094	508.3	-	33.10	491
46	276	0.0040	0.006	0.224	-	-	0.087	0.005	0.002	0.12	0.097	543.1	-	34.31	526
47	282	0.0040	0.006	0.230	-	-	0.091	0.005	0.002	0.12	0.100	579.1	-	35.44	561
48	288	0.0040	0.006	0.237	-	-	0.096	0.005	0.002	0.13	0.103	616.2	-	36.51	598
49	294	0.0050	0.008	0.245	-	-	0.102	0.006	0.003	0.16	0.107	654.9	-	37.86	636
50	300	0.0040	0.006	0.251	-	-	0.107	0.005	0.002	0.13	0.112	695.0	-	39.44	675
51	306	0.0050	0.008	0.259	-	-	0.113	0.006	0.003	0.16	0.116	736.7	-	40.91	716
52	312	0.0040	0.006	0.266	-	-	0.118	0.005	0.002	0.13	0.119	779.6	-	42.28	758
53	318	0.0050	0.008	0.274	-	-	0.124	0.006	0.003	0.17	0.123	823.8	-	43.55	802
54	324	0.0050	0.008	0.282	-	-	0.130	0.006	0.003	0.17	0.128	869.8	-	45.09	847
55	330	0.0050	0.008	0.290	-	-	0.137	0.006	0.003	0.17	0.133	917.5	-	46.86	894
56	336	0.0050	0.008	0.298	-	-	0.143	0.006	0.003	0.17	0.137	966.8	-	48.49	942
57	342	0.0050	0.008	0.306	-	-	0.150	0.006	0.003	0.17	0.141	1,017.5	-	50.00	992
58	348	0.0050	0.008	0.314	-	-	0.156	0.007	0.003	0.17	0.145	1,069.6	-	51.40	1,044
59	354	0.0050	0.008	0.322	-	-	0.163	0.007	0.003	0.18	0.148	1,122.9	-	52.69	1,096
60	360	0.0060	0.010	0.331	-	-	0.171	0.008	0.004	0.21	0.153	1,178.1	-	54.26	1,150
61	366	0.0060	0.010	0.341	-	-	0.179	0.008	0.004	0.21	0.160	1,235.8	-	56.44	1,207
62	372	0.0060	0.010	0.350	-	-	0.187	0.008	0.004	0.22	0.166	1,295.7	-	58.79	1,266
63	378	0.0060	0.010	0.360	-	-	0.195	0.008	0.004	0.22	0.172	1,357.6	-	60.95	1,327
64	384	0.0070	0.011	0.371	-	-	0.204	0.010	0.005	0.25	0.179	1,422.3	-	63.29	1,390
65	390	0.0060	0.010	0.381	-	-	0.212	0.008	0.004	0.22	0.186	1,489.3	-	65.81	1,456
66	396	0.0060	0.010	0.390	-	-	0.221	0.008	0.004	0.22	0.190	1,557.7	-	67.72	1,523
67	402	0.0060	0.010	0.400	-	-	0.229	0.008	0.004	0.22	0.194	1,627.4	-	69.09	1,593
68	408	0.0060	0.010	0.410	-	-	0.237	0.008	0.004	0.22	0.197	1,698.4	-	70.35	1,663
69	414	0.0060	0.010	0.419	-	-	0.246	0.008	0.004	0.22	0.200	1,770.5	-	71.52	1,734
70	420	0.0070	0.011	0.430	-	-	0.256	0.010	0.005	0.26	0.205	1,844.4	-	72.98	1,807
71	426	0.0070	0.011	0.442	-	-	0.266	0.010	0.005	0.26	0.212	1,920.7	-	75.10	1,883
72	432	0.0080	0.013	0.454	-	-	0.277	0.011	0.006	0.30	0.220	2,000.0	-	77.82	1,960
73	438	0.0080	0.013	0.467	-	-	0.288	0.011	0.006	0.31	0.230	2,082.8	-	81.07	2,041
74	444	0.0090	0.014	0.482	-	-	0.301	0.013	0.006	0.35	0.241	2,169.6	-	84.79	2,126
75	450	0.0100	0.016	0.498	-	-	0.316	0.014	0.007	0.39	0.255	2,261.5	-	89.35	2,216
76	456	0.0210	0.034	0.531	-	-	0.346	0.031	0.015	0.82	0.295	2,367.7	-	99.08	2,315
77	462	0.0240	0.038	0.570	-	-	0.382	0.035	0.018	0.94	0.362	2,498.2	-	118.33	2,433
78	468	0.0240	0.038	0.608	-	-	0.417	0.036	0.018	0.95	0.429	2,652.8	-	142.50	2,575
79	474	0.0240	0.038	0.646	-	-	0.453	0.036	0.018	0.96	0.490	2,829.1	-	165.45	2,741
80	480	0.0220	0.035	0.682	-	-	0.486	0.033	0.017	0.88	0.539	3,023.2	-	185.23	2,926
81	486	0.0140	0.022	0.704	0.000	0.000	0.507	0.021	0.011	0.57	0.561	3,225.0	-	197.98	3,124
82	492	0.0130	0.021	0.725	0.000	0.000	0.527	0.020	0.010	0.53	0.559	3,426.3	-	201.53	3,326
83	498	0.0100	0.016	0.741	0.000	0.000	0.542	0.015	0.008	0.41	0.549	3,623.9	-	199.45	3,525
84	504	0.0100	0.016	0.757	0.001	0.000	0.557	0.015	0.008	0.42	0.534	3,816.0	-	194.87	3,720
85	510	0.0080	0.013	0.770	0.001	0.000	0.569	0.012	0.006	0.34	0.516	4,001.7	-	188.88	3,909
86	516	0.0090	0.014	0.784	0.002	0.001	0.583	0.014	0.007	0.38	0.498	4,180.9	-	182.43	4,091
87	522	0.0090	0.014	0.798	0.003	0.001	0.597	0.014	0.007	0.39	0.485	4,355.4	-	176.86	4,268
88	528	0.0070	0.011	0.810	0.003	0.001	0.608	0.011	0.006	0.30	0.469	4,524.1	-	171.62	4,440
89	534	0.0080	0.013	0.822	0.004	0.001	0.620	0.012	0.007	0.35	0.452	4,686.9	-	165.76	4,606
90	540	0.0070	0.011	0.834	0.005	0.001	0.630	0.011	0.006	0.31	0.438	4,844.6	-	160.24	4,766
91	546	0.0070	0.011	0.845	0.006	0.001	0.641	0.011	0.006	0.31	0.423	4,996.9	-	154.98	4,921
92	552	0.0060	0.010	0.854	0.006	0.001	0.650	0.009	0.005	0.27	0.408	5,143.6	-	149.50	5,070
93	558	0.0060	0.010	0.864	0.007	0.001	0.660	0.009	0.005	0.27	0.391	5,284.5	-	143.80	5,214

Area 1 - Proposed

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
					Pervious Area		Impervious Area								
Time Increment t	Elapsed Time	Rainfall Distr.	Incremental Rainfall P(t)	Accumulated Rainfall P	Accumulated Runoff	Incremental Runoff D_{perv} (t)	Accumulated Runoff	Incremental Runoff D_{imp}(t)	Total Runoff D(t)	Instant Flow Rate I(t)	Design Flow Rate Q(t)	Accumulated Runoff	Infiltration Rate O(t)	Change in Storage	Storage
	(minutes)	(fraction)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(cfs)	(cfs)	(cf)	(cfs)	(cf)	(cf)
94	564	0.0060	0.010	0.874	0.008	0.001	0.669	0.009	0.005	0.27	0.377	5,420.3	-	138.37	5,352
95	570	0.0050	0.008	0.882	0.009	0.001	0.677	0.008	0.004	0.23	0.362	5,550.8	-	133.15	5,486
96	576	0.0060	0.010	0.891	0.010	0.001	0.686	0.009	0.005	0.27	0.349	5,676.6	-	128.11	5,614
97	582	0.0050	0.008	0.899	0.010	0.001	0.694	0.008	0.004	0.23	0.338	5,798.2	-	123.70	5,737
98	588	0.0060	0.010	0.909	0.011	0.001	0.703	0.009	0.005	0.27	0.328	5,916.3	-	119.85	5,857
99	594	0.0050	0.008	0.917	0.012	0.001	0.710	0.008	0.004	0.23	0.319	6,031.2	-	116.49	5,974
100	600	0.0050	0.008	0.925	0.013	0.001	0.718	0.008	0.004	0.23	0.309	6,142.4	-	113.08	6,087
101	606	0.0050	0.008	0.933	0.014	0.001	0.726	0.008	0.004	0.23	0.300	6,250.4	-	109.63	6,196
102	612	0.0050	0.008	0.941	0.015	0.001	0.734	0.008	0.004	0.23	0.292	6,355.6	-	106.61	6,303
103	618	0.0050	0.008	0.949	0.016	0.001	0.741	0.008	0.004	0.23	0.285	6,458.4	-	103.98	6,407
104	624	0.0040	0.006	0.955	0.017	0.001	0.748	0.006	0.004	0.19	0.277	6,558.0	-	101.20	6,508
105	630	0.0050	0.008	0.963	0.018	0.001	0.755	0.008	0.004	0.23	0.269	6,655.0	-	98.29	6,607
106	636	0.0050	0.008	0.971	0.019	0.001	0.763	0.008	0.004	0.24	0.265	6,750.5	-	96.24	6,703
107	642	0.0040	0.006	0.978	0.020	0.001	0.769	0.006	0.004	0.19	0.259	6,843.9	-	94.45	6,797
108	648	0.0050	0.008	0.986	0.021	0.001	0.777	0.008	0.004	0.24	0.254	6,935.3	-	92.41	6,890
109	654	0.0050	0.008	0.994	0.022	0.001	0.785	0.008	0.004	0.24	0.252	7,026.1	-	91.12	6,981
110	660	0.0040	0.006	1.000	0.023	0.001	0.791	0.006	0.004	0.19	0.248	7,115.4	-	90.02	7,071
111	666	0.0040	0.006	1.006	0.024	0.001	0.797	0.006	0.004	0.19	0.241	7,202.3	-	88.08	7,159
112	672	0.0050	0.008	1.014	0.025	0.001	0.805	0.008	0.004	0.24	0.239	7,288.1	-	86.39	7,245
113	678	0.0040	0.006	1.021	0.026	0.001	0.811	0.006	0.004	0.19	0.236	7,373.1	-	85.42	7,331
114	684	0.0040	0.006	1.027	0.027	0.001	0.817	0.006	0.004	0.19	0.231	7,456.3	-	84.09	7,415
115	690	0.0040	0.006	1.034	0.028	0.001	0.824	0.006	0.004	0.19	0.227	7,538.0	-	82.44	7,497
116	696	0.0040	0.006	1.040	0.030	0.001	0.830	0.006	0.004	0.19	0.223	7,618.3	-	80.99	7,578
117	702	0.0040	0.006	1.046	0.031	0.001	0.836	0.006	0.004	0.20	0.220	7,697.5	-	79.74	7,658
118	708	0.0040	0.006	1.053	0.032	0.001	0.842	0.006	0.004	0.20	0.217	7,775.6	-	78.65	7,737
119	714	0.0030	0.005	1.058	0.033	0.001	0.847	0.005	0.003	0.15	0.212	7,851.9	-	77.20	7,814
120	720	0.0040	0.006	1.064	0.034	0.001	0.853	0.006	0.004	0.20	0.207	7,926.5	-	75.43	7,889
121	726	0.0040	0.006	1.070	0.035	0.001	0.859	0.006	0.004	0.20	0.206	8,000.7	-	74.39	7,964
122	732	0.0030	0.005	1.075	0.036	0.001	0.864	0.005	0.003	0.15	0.202	8,073.5	-	73.49	8,037
123	738	0.0040	0.006	1.082	0.037	0.001	0.870	0.006	0.004	0.20	0.199	8,145.0	-	72.19	8,109
124	744	0.0040	0.006	1.088	0.038	0.001	0.876	0.006	0.004	0.20	0.199	8,216.6	-	71.58	8,181
125	750	0.0040	0.006	1.094	0.039	0.001	0.883	0.006	0.004	0.20	0.199	8,288.2	-	71.56	8,252
126	756	0.0040	0.006	1.101	0.041	0.001	0.889	0.006	0.004	0.20	0.199	8,359.8	-	71.57	8,324
127	762	0.0030	0.005	1.106	0.041	0.001	0.894	0.005	0.003	0.15	0.196	8,430.3	-	71.09	8,395
128	768	0.0040	0.006	1.112	0.043	0.001	0.900	0.006	0.004	0.20	0.194	8,500.1	-	70.15	8,465
129	774	0.0030	0.005	1.117	0.044	0.001	0.904	0.005	0.003	0.15	0.192	8,569.0	-	69.35	8,535
130	780	0.0040	0.006	1.123	0.045	0.001	0.911	0.006	0.004	0.20	0.190	8,637.4	-	68.65	8,603
131	786	0.0040	0.006	1.130	0.046	0.001	0.917	0.006	0.004	0.20	0.191	8,706.2	-	68.57	8,672
132	792	0.0030	0.005	1.134	0.047	0.001	0.922	0.005	0.003	0.15	0.189	8,774.4	-	68.51	8,740
133	798	0.0040	0.006	1.141	0.049	0.001	0.928	0.006	0.004	0.20	0.188	8,842.1	-	67.95	8,808
134	804	0.0040	0.006	1.147	0.050	0.001	0.934	0.006	0.004	0.20	0.190	8,910.4	-	68.00	8,876
135	810	0.0030	0.005	1.152	0.051	0.001	0.939	0.005	0.003	0.15	0.188	8,978.2	-	68.06	8,944
136	816	0.0030	0.005	1.157	0.052	0.001	0.943	0.005	0.003	0.15	0.184	9,044.5	-	67.08	9,011
137	822	0.0040	0.006	1.163	0.053	0.001	0.950	0.006	0.004	0.20	0.184	9,110.6	-	66.22	9,078
138	828	0.0030	0.005	1.168	0.054	0.001	0.954	0.005	0.003	0.15	0.183	9,176.6	-	66.01	9,144
139	834	0.0040	0.006	1.174	0.056	0.001	0.961	0.006	0.004	0.21	0.183	9,242.3	-	65.83	9,209
140	840	0.0030	0.005	1.179	0.057	0.001	0.965	0.005	0.003	0.15	0.182	9,307.9	-	65.69	9,275
141	846	0.0030	0.005	1.184	0.058	0.001	0.970	0.005	0.003	0.15	0.179	9,372.4	-	65.04	9,340
142	852	0.0040	0.006	1.190	0.059	0.001	0.976	0.006	0.004	0.21	0.179	9,436.9	-	64.49	9,405
143	858	0.0030	0.005	1.195	0.061	0.001	0.981	0.005	0.003	0.15	0.179	9,501.5	-	64.54	9,469
144	864	0.0030	0.005	1.200	0.062	0.001	0.986	0.005	0.003	0.16	0.177	9,565.0	-	64.07	9,533
145	870	0.0040	0.006	1.206	0.063	0.001	0.992	0.006	0.004	0.21	0.177	9,628.8	-	63.67	9,597
146	876	0.0030	0.005	1.211	0.064	0.001	0.997	0.005	0.003	0.16	0.178	9,692.8	-	63.86	9,661
147	882	0.0030	0.005	1.216	0.065	0.001	1.001	0.005	0.003	0.16	0.175	9,755.8	-	63.50	9,724
148	888	0.0040	0.006	1.222	0.067	0.002	1.008	0.006	0.004	0.21	0.176	9,819.2	-	63.20	9,787
149	894	0.0030	0.005	1.227	0.068	0.001	1.012	0.005	0.003	0.16	0.177	9,882.8	-	63.48	9,851
150	900	0.0030	0.005	1.232	0.069	0.001	1.017	0.005	0.003	0.16	0.174	9,945.6	-	63.21	9,914
151	906	0.0030	0.005	1.237	0.070	0.001	1.022	0.005	0.003	0.16	0.172	10,007.6	-	62.44	9,977
152	912	0.0040	0.006	1.243	0.072	0.002	1.028	0.006	0.004	0.21	0.174	10,070.2	-	62.31	10,039
153	918	0.0030	0.005	1.248	0.073	0.001	1.033	0.005	0.003	0.16	0.175	10,133.1	-	62.74	10,102
154	924	0.0030	0.005	1.253	0.074	0.001	1.037	0.005	0.003	0.16	0.173	10,195.4	-	62.60	10,164
155	930	0.0030	0.005	1.258	0.076	0.001	1.042	0.005	0.003	0.16	0.171	10,257.0	-	61.94	10,226
156	936	0.0030	0.005	1.262	0.077	0.001	1.047	0.005	0.003	0.16	0.170	10,318.1	-	61.37	10,288
157	942	0.0040	0.006	1.269	0.079	0.002	1.053	0.006	0.004	0.21	0.171	10,379.9	-	61.42	10,349
158	948	0.0030	0.005	1.274	0.080	0.001	1.058	0.005	0.003	0.16	0.173	10,442.2	-	62.03	10,411
159	954	0.0030	0.005	1.278	0.081	0.001	1.062	0.005	0.003	0.16	0.171	10,503.9	-	62.02	10,473
160	960	0.0030	0.005	1.283	0.082	0.001	1.067	0.005	0.003	0.16	0.170	10,565.1	-	61.49	10,535
161	966	0.0030	0.005	1.288	0.084	0.001	1.072	0.005	0.003	0.16	0.169	10,626.0	-	61.02	10,596
162	972	0.0030	0.005	1.293	0.085	0.001	1.077	0.005	0.003	0.16	0.168	10,686.4	-	60.62	10,656
163	978	0.0030	0.005	1.298	0.086	0.001	1.081	0.005	0.003	0.16	0.167	10,746.5	-	60.27	10,716
164	984	0.0030	0.005	1.302	0.087	0.001	1.086	0.005	0.003	0.16	0.166	10,806.3	-	59.97	10,776
165	990	0.0030	0.005	1.307	0.089	0.001	1.091	0.005	0.003	0.16	0.166	10,865.9	-	59.72	10,836
166	996	0.0030	0.005	1.312	0.090	0.001	1.095	0.005	0.003	0.16	0.165	10,925.3	-	59.50	10,896
167	1002	0.0030	0.005	1.317	0.091	0.001	1.100	0.005	0.003	0.16	0.165	10,984.6	-	59.32	10,955
168	1008	0.0030	0.005	1.322	0.093	0.001	1.105	0.005	0.003	0.16	0.164	11,043.7	-	59.17	11,014
169	1014	0.0030	0.005	1.326	0.094	0.001	1.109	0.005	0.003	0.16	0.164	11,102.7	-	59.05	11,073
170	1020	0.0030	0.005	1.331	0.095	0.001	1.114	0.005	0.003	0.16	0.164	11,161.6	-	58.95	11,132
171	1026	0.0030	0.005	1.336	0.097	0.001	1.119	0.005	0.003	0.16	0.163	11,220.4	-	58.87	11,191

Area 1 - Proposed

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
					Pervious Area		Impervious Area								
Time Increment t	Elapsed Time	Rainfall Distr.	Incremental Rainfall P(t)	Accumulated Rainfall P	Accumulated Runoff	Incremental Runoff D_{perv} (t)	Accumulated Runoff	Incremental Runoff D_{imp}(t)	Total Runoff D(t)	Instant Flow Rate I(t)	Design Flow Rate Q(t)	Accumulated Runoff	Infiltration Rate O(t)	Change in Storage	Storage
	(minutes)	(fraction)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(cfs)	(cfs)	(cf)	(cfs)	(cf)	(cf)
172	1032	0.0030	0.005	1.341	0.098	0.001	1.124	0.005	0.003	0.16	0.163	11,279.2	-	58.81	11,250
173	1038	0.0030	0.005	1.346	0.099	0.001	1.128	0.005	0.003	0.16	0.163	11,338.0	-	58.77	11,309
174	1044	0.0030	0.005	1.350	0.101	0.001	1.133	0.005	0.003	0.16	0.163	11,396.7	-	58.74	11,367
175	1050	0.0030	0.005	1.355	0.102	0.001	1.138	0.005	0.003	0.16	0.163	11,455.4	-	58.72	11,426
176	1056	0.0030	0.005	1.360	0.104	0.001	1.142	0.005	0.003	0.16	0.163	11,514.1	-	58.72	11,485
177	1062	0.0020	0.003	1.363	0.105	0.001	1.146	0.003	0.002	0.11	0.160	11,571.7	-	58.16	11,543
178	1068	0.0030	0.005	1.368	0.106	0.001	1.150	0.005	0.003	0.16	0.157	11,628.4	-	57.11	11,600
179	1074	0.0030	0.005	1.373	0.107	0.001	1.155	0.005	0.003	0.16	0.158	11,685.2	-	56.75	11,657
180	1080	0.0030	0.005	1.378	0.109	0.001	1.160	0.005	0.003	0.16	0.159	11,742.4	-	57.01	11,714
181	1086	0.0030	0.005	1.382	0.110	0.001	1.164	0.005	0.003	0.16	0.159	11,799.7	-	57.24	11,771
182	1092	0.0020	0.003	1.386	0.111	0.001	1.168	0.003	0.002	0.11	0.157	11,856.2	-	56.89	11,828
183	1098	0.0030	0.005	1.390	0.113	0.001	1.172	0.005	0.003	0.16	0.154	11,911.8	-	56.03	11,884
184	1104	0.0030	0.005	1.395	0.114	0.001	1.177	0.005	0.003	0.16	0.156	11,967.8	-	55.83	11,940
185	1110	0.0030	0.005	1.400	0.115	0.001	1.182	0.005	0.003	0.17	0.157	12,024.3	-	56.23	11,996
186	1116	0.0020	0.003	1.403	0.116	0.001	1.185	0.003	0.002	0.11	0.155	12,079.9	-	56.03	12,052
187	1122	0.0030	0.005	1.408	0.118	0.001	1.190	0.005	0.003	0.17	0.153	12,134.8	-	55.29	12,107
188	1128	0.0030	0.005	1.413	0.119	0.001	1.194	0.005	0.003	0.17	0.154	12,190.3	-	55.21	12,163
189	1134	0.0020	0.003	1.416	0.120	0.001	1.197	0.003	0.002	0.11	0.152	12,245.1	-	55.15	12,218
190	1140	0.0030	0.005	1.421	0.122	0.001	1.202	0.005	0.003	0.17	0.151	12,299.4	-	54.53	12,272
191	1146	0.0030	0.005	1.426	0.123	0.001	1.207	0.005	0.003	0.17	0.152	12,354.2	-	54.56	12,327
192	1152	0.0020	0.003	1.429	0.124	0.001	1.210	0.003	0.002	0.11	0.151	12,408.5	-	54.59	12,381
193	1158	0.0030	0.005	1.434	0.126	0.002	1.215	0.005	0.003	0.17	0.149	12,462.3	-	54.05	12,435
194	1164	0.0020	0.003	1.437	0.127	0.001	1.218	0.003	0.002	0.11	0.148	12,515.7	-	53.58	12,489
195	1170	0.0030	0.005	1.442	0.128	0.002	1.223	0.005	0.003	0.17	0.147	12,568.7	-	53.18	12,542
196	1176	0.0030	0.005	1.446	0.130	0.002	1.227	0.005	0.003	0.17	0.149	12,622.5	-	53.40	12,596
197	1182	0.0020	0.003	1.450	0.131	0.001	1.231	0.003	0.002	0.11	0.148	12,675.9	-	53.60	12,649
198	1188	0.0030	0.005	1.454	0.132	0.002	1.235	0.005	0.003	0.17	0.147	12,728.9	-	53.21	12,702
199	1194	0.0020	0.003	1.458	0.134	0.001	1.238	0.003	0.002	0.11	0.146	12,781.6	-	52.87	12,755
200	1200	0.0030	0.005	1.462	0.135	0.002	1.243	0.005	0.003	0.17	0.146	12,834.1	-	52.57	12,808
201	1206	0.0020	0.003	1.466	0.136	0.001	1.246	0.003	0.002	0.11	0.145	12,886.2	-	52.31	12,860
202	1212	0.0030	0.005	1.470	0.138	0.002	1.251	0.005	0.003	0.17	0.144	12,938.2	-	52.09	12,912
203	1218	0.0020	0.003	1.474	0.139	0.001	1.254	0.003	0.002	0.11	0.144	12,990.1	-	51.91	12,964
204	1224	0.0020	0.003	1.477	0.140	0.001	1.257	0.003	0.002	0.11	0.140	13,040.6	-	51.16	13,015
205	1230	0.0030	0.005	1.482	0.141	0.002	1.262	0.005	0.003	0.17	0.140	13,091.1	-	50.51	13,066
206	1236	0.0020	0.003	1.485	0.142	0.001	1.265	0.003	0.002	0.11	0.140	13,141.6	-	50.52	13,116
207	1242	0.0030	0.005	1.490	0.144	0.002	1.270	0.005	0.003	0.17	0.140	13,192.2	-	50.54	13,167
208	1248	0.0020	0.003	1.493	0.145	0.001	1.273	0.003	0.002	0.11	0.140	13,242.7	-	50.56	13,217
209	1254	0.0020	0.003	1.496	0.146	0.001	1.276	0.003	0.002	0.11	0.137	13,292.1	-	49.99	13,267
210	1260	0.0030	0.005	1.501	0.148	0.002	1.281	0.005	0.003	0.17	0.138	13,341.7	-	49.50	13,317
211	1266	0.0020	0.003	1.504	0.149	0.001	1.284	0.003	0.002	0.11	0.138	13,391.5	-	49.66	13,367
212	1272	0.0020	0.003	1.507	0.150	0.001	1.287	0.003	0.002	0.11	0.135	13,440.2	-	49.21	13,416
213	1278	0.0030	0.005	1.512	0.152	0.002	1.292	0.005	0.003	0.17	0.136	13,489.1	-	48.83	13,465
214	1284	0.0020	0.003	1.515	0.153	0.001	1.295	0.003	0.002	0.11	0.137	13,538.3	-	49.07	13,514
215	1290	0.0020	0.003	1.518	0.154	0.001	1.298	0.003	0.002	0.11	0.134	13,586.5	-	48.71	13,562
216	1296	0.0030	0.005	1.523	0.155	0.002	1.303	0.005	0.003	0.17	0.135	13,635.1	-	48.40	13,611
217	1302	0.0020	0.003	1.526	0.156	0.001	1.306	0.003	0.002	0.11	0.136	13,683.9	-	48.71	13,660
218	1308	0.0020	0.003	1.530	0.158	0.001	1.309	0.003	0.002	0.11	0.133	13,731.9	-	48.40	13,708
219	1314	0.0020	0.003	1.533	0.159	0.001	1.312	0.003	0.002	0.11	0.131	13,779.0	-	47.55	13,755
220	1320	0.0020	0.003	1.536	0.160	0.001	1.316	0.003	0.002	0.11	0.129	13,825.5	-	46.80	13,802
221	1326	0.0021	0.003	1.539	0.161	0.001	1.319	0.003	0.002	0.12	0.128	13,871.4	-	46.19	13,848
222	1332	0.0020	0.003	1.543	0.162	0.001	1.322	0.003	0.002	0.11	0.126	13,916.9	-	45.72	13,894
223	1338	0.0020	0.003	1.546	0.163	0.001	1.325	0.003	0.002	0.11	0.125	13,961.9	-	45.25	13,939
224	1344	0.0020	0.003	1.549	0.164	0.001	1.328	0.003	0.002	0.11	0.124	14,006.5	-	44.77	13,984
225	1350	0.0020	0.003	1.552	0.165	0.001	1.332	0.003	0.002	0.11	0.123	14,050.6	-	44.36	14,029
226	1356	0.0020	0.003	1.555	0.167	0.001	1.335	0.003	0.002	0.11	0.122	14,094.5	-	43.99	14,073
227	1362	0.0020	0.003	1.559	0.168	0.001	1.338	0.003	0.002	0.11	0.121	14,138.0	-	43.68	14,116
228	1368	0.0020	0.003	1.562	0.169	0.001	1.341	0.003	0.002	0.11	0.120	14,181.3	-	43.40	14,160
229	1374	0.0020	0.003	1.565	0.170	0.001	1.344	0.003	0.002	0.11	0.120	14,224.3	-	43.15	14,203
230	1380	0.0020	0.003	1.568	0.171	0.001	1.347	0.003	0.002	0.11	0.119	14,267.1	-	42.94	14,246
231	1386	0.0020	0.003	1.571	0.172	0.001	1.350	0.003	0.002	0.11	0.119	14,309.8	-	42.76	14,288
232	1392	0.0020	0.003	1.575	0.173	0.001	1.354	0.003	0.002	0.12	0.118	14,352.3	-	42.60	14,331
233	1398	0.0020	0.003	1.578	0.174	0.001	1.357	0.003	0.002	0.12	0.118	14,394.7	-	42.46	14,374
234	1404	0.0020	0.003	1.581	0.176	0.001	1.360	0.003	0.002	0.12	0.117	14,437.0	-	42.34	14,416
235	1410	0.0020	0.003	1.584	0.177	0.001	1.363	0.003	0.002	0.12	0.117	14,479.2	-	42.24	14,458
236	1416	0.0020	0.003	1.587	0.178	0.001	1.366	0.003	0.002	0.12	0.117	14,521.3	-	42.15	14,500
237	1422	0.0020	0.003	1.591	0.179	0.001	1.369	0.003	0.002	0.12	0.117	14,563.4	-	42.08	14,542
238	1428	0.0020	0.003	1.594	0.180	0.001	1.373	0.003	0.002	0.12	0.117	14,605.4	-	42.02	14,584
239	1434	0.0020	0.003	1.597	0.181	0.001	1.376	0.003	0.002	0.12	0.117	14,647.3	-	41.97	14,626
240	1440	0.0020	0.003	1.600	0.183	0.001	1.379	0.003	0.002	0.12	0.116	14,689.2	-	41.93	14,668

Area 2 - Existing

Storm: 25Yr 24Hr

SCS Type 1A Storm Hyetograph Values

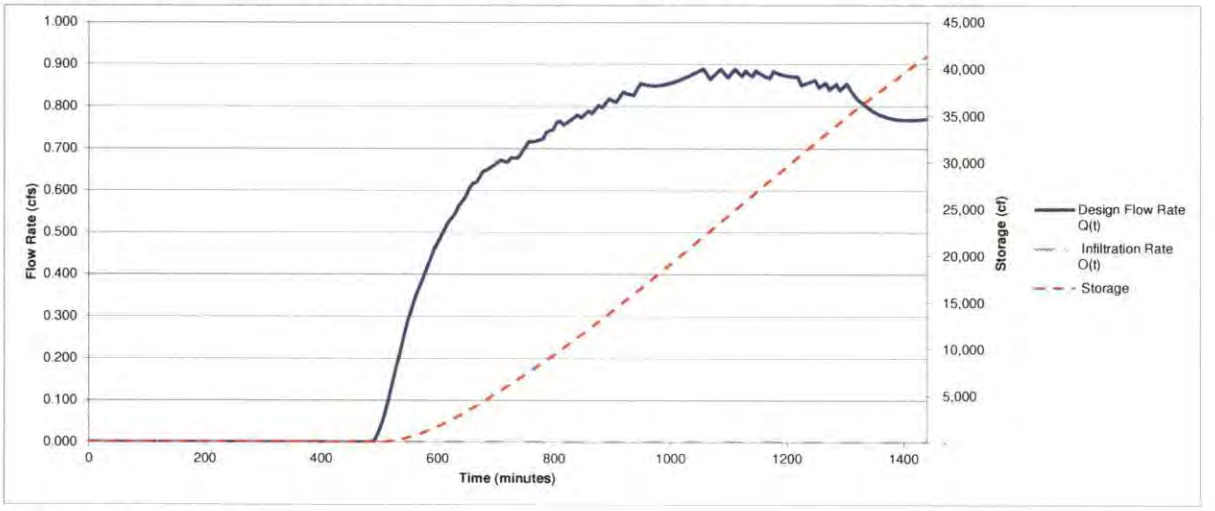
Santa Barbara Urban Hydrograph Method

Drainage Basin Area, A =	66.09	acres	Abstract Runoff Value, S =	(1000/CN) - 10	
Total Rainfall, P25yr24hr =	1.6	inches	Runoff Curve Number, CN =	per Table 4.5.2	
Time Increment, dt =	6	minutes	Routing Constant, w =	dt/(2*Tc + dt)	
Time of Concentration, Tc =	49.3	minutes	w =	0.057	
Total Infiltration Rate =	-	cfs			

Summary

Peak Design Flow =	0.890	cfs
Required Storage =	41,385	cf
Peak Hour Runoff =	3,169	cf

Pervious Area:	A_{perv}=	66.085	acres	CN_{perv} =	74	S_{perv} =	3.51	$0.2*S_{perv}$ =	0.70
Impervious Area:	A_{imp}=	0.000	acres	CN_{imp} =	98	S_{imp} =	0.20	$0.2*S_{imp}$ =	0.04



Column Description and Formula

1 Time Step or Increment, t
2 Elapsed Time (minutes)
3 Rainfall Distribution, Type 1A Storm from Table 4.2.2
4 Incremental Rainfall, P(t) = Column 3 * P
5 Accumulated Rainfall, P = Accumulated Sum of Column 4
6 Accumulated Runoff Depth Pervious Area — If $P \le 0.2*S_{perv}$, then = 0; otherwise, If $P > 0.2*S_{perv}$, then = $(P - 0.2*S_{perv})^2/(P + 0.8*S_{perv})$
7 Incremental Runoff Depth, $D_{perv}(t)$ = Column 6 of present step - Column 6 of prevous step
8 Accumulated Runoff Depth Impervious Area — If $P \le 0.2S_{imp}$, then = 0; otherwise, If $P > 0.2S_{imp}$, then = $(P - 0.2*S_{imp})^2/(P + 0.8*S_{imp})$
9 Incremental Runoff Depth, $D_{imp}(t)$ = Column 7 of present step - Column 7 of prevous step
10 Total Runoff Depth, $D(t) = (A_{perv}/A)*D_{perv}(t) + (A_{imp}/A)\cdot D_{imp}(t)$
11 Instantaneaous Hydrograph Flow Rate, I(t) = 60.5*D(t) * A/dt
12 Design Flow Rate, Q(t+1) = Q(t) + w*[I(t) + I(t+1) - 2*Q(t)]
13 Accumulated Runoff = Q(t)*dt*60 sec/min + Column 13 of previous step
14 Infiltration Rate = (Ksat/(12* 3600)) * Al
15 Change in Storage = dt * { [(I(t)+I(t-1))/2] - [(O(t)+O(t-1))/2]}
16 Storage = Storage from previous step plus change in storage

Area 2 - Existing

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
					Pervious Area		Impervious Area								
Time Increment t	Elapsed Time	Rainfall Distr.	Incremental Raintall P(t)	Accumulated Rainfall P	Accumulated Runoff	Incremental Runoff D_{perv} (t)	Accumulated Runoff	Incremental Runoff $D_{imp}(t)$	Total Runoff D(t)	Instant Flow Rate I(t)	Design Flow Rate Q(t)	Accumulated Runoff	Infiltration Rate O(t)	Change in Storage	Storage
	(minutes)	(fraction)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(cfs)	(cfs)	(cf)	(cfs)	(cf)	(cf)
0	0		-	-	-	-	-	-	-	-	-	-	-	-	-
1	6	0.0020	0.003	0.003	-	-	-	-	-	-	-	-	-	-	-
2	12	0.0020	0.003	0.006	-	-	-	-	-	-	-	-	-	-	-
3	18	0.0020	0.003	0.010	-	-	-	-	-	-	-	-	-	-	-
4	24	0.0020	0.003	0.013	-	-	-	-	-	-	-	-	-	-	-
5	30	0.0020	0.003	0.016	-	-	-	-	-	-	-	-	-	-	-
6	36	0.0020	0.003	0.019	-	-	-	-	-	-	-	-	-	-	-
7	42	0.0020	0.003	0.022	-	-	-	-	-	-	-	-	-	-	-
8	48	0.0020	0.003	0.026	-	-	-	-	-	-	-	-	-	-	-
9	54	0.0020	0.003	0.029	-	-	-	-	-	-	-	-	-	-	-
10	60	0.0020	0.003	0.032	-	-	-	-	-	-	-	-	-	-	-
11	66	0.0030	0.005	0.037	-	-	-	-	-	-	-	-	-	-	-
12	72	0.0030	0.005	0.042	-	-	0.000	0.000	-	-	-	-	-	-	-
13	78	0.0030	0.005	0.046	-	-	0.000	0.000	-	-	-	-	-	-	-
14	84	0.0030	0.005	0.051	-	-	0.001	0.000	-	-	-	-	-	-	-
15	90	0.0030	0.005	0.056	-	-	0.001	0.001	-	-	-	-	-	-	-

Area 2 - Existing

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
					Pervious Area		Impervious Area								
Time Increment t	Elapsed Time	Rainfall Distr.	Incremental Rainfall P(t)	Accumulated Rainfall P	Accumulated Runoff	Incremental Runoff D_{perv} (t)	Accumulated Runoff	Incremental Runoff D_{imp}(t)	Total Runoff D(t)	Instant Flow Rate I(t)	Design Flow Rate Q(t)	Accumulated Runoff	Infiltration Rate O(t)	Change in Storage	Storage
	(minutes)	(fraction)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(cfs)	(cfs)	(cf)	(cfs)	(cf)	(cf)
16	96	0.0030	0.005	0.061	-	-	0.002	0.001	-	-	-	-	-	-	-
17	102	0.0030	0.005	0.066	-	-	0.003	0.001	-	-	-	-	-	-	-
18	108	0.0030	0.005	0.070	-	-	0.004	0.001	-	-	-	-	-	-	-
19	114	0.0030	0.005	0.075	-	-	0.005	0.001	-	-	-	-	-	-	-
20	120	0.0030	0.005	0.080	-	-	0.006	0.001	-	-	-	-	-	-	-
21	126	0.0030	0.005	0.085	-	-	0.008	0.001	-	-	-	-	-	-	-
22	132	0.0030	0.005	0.090	-	-	0.009	0.002	-	-	-	-	-	-	-
23	138	0.0040	0.006	0.096	-	-	0.012	0.002	-	-	-	-	-	-	-
24	144	0.0030	0.005	0.101	-	-	0.014	0.002	-	-	-	-	-	-	-
25	150	0.0030	0.005	0.106	-	-	0.016	0.002	-	-	-	-	-	-	-
26	156	0.0030	0.005	0.110	-	-	0.018	0.002	-	-	-	-	-	-	-
27	162	0.0030	0.005	0.115	-	-	0.020	0.002	-	-	-	-	-	-	-
28	168	0.0040	0.006	0.122	-	-	0.023	0.003	-	-	-	-	-	-	-
29	174	0.0030	0.005	0.126	-	-	0.025	0.002	-	-	-	-	-	-	-
30	180	0.0030	0.005	0.131	-	-	0.028	0.002	-	-	-	-	-	-	-
31	186	0.0030	0.005	0.136	-	-	0.030	0.003	-	-	-	-	-	-	-
32	192	0.0030	0.005	0.141	-	-	0.033	0.003	-	-	-	-	-	-	-
33	198	0.0030	0.005	0.146	-	-	0.036	0.003	-	-	-	-	-	-	-
34	204	0.0040	0.006	0.152	-	-	0.039	0.004	-	-	-	-	-	-	-
35	210	0.0030	0.005	0.157	-	-	0.042	0.003	-	-	-	-	-	-	-
36	216	0.0040	0.006	0.163	-	-	0.046	0.004	-	-	-	-	-	-	-
37	222	0.0040	0.006	0.170	-	-	0.050	0.004	-	-	-	-	-	-	-
38	228	0.0030	0.005	0.174	-	-	0.053	0.003	-	-	-	-	-	-	-
39	234	0.0040	0.006	0.181	-	-	0.057	0.004	-	-	-	-	-	-	-
40	240	0.0040	0.006	0.187	-	-	0.061	0.004	-	-	-	-	-	-	-
41	246	0.0030	0.005	0.192	-	-	0.064	0.003	-	-	-	-	-	-	-
42	252	0.0040	0.006	0.198	-	-	0.069	0.004	-	-	-	-	-	-	-
43	258	0.0040	0.006	0.205	-	-	0.073	0.004	-	-	-	-	-	-	-
44	264	0.0040	0.006	0.211	-	-	0.078	0.004	-	-	-	-	-	-	-
45	270	0.0040	0.006	0.218	-	-	0.082	0.005	-	-	-	-	-	-	-
46	276	0.0040	0.006	0.224	-	-	0.087	0.005	-	-	-	-	-	-	-
47	282	0.0040	0.006	0.230	-	-	0.091	0.005	-	-	-	-	-	-	-
48	288	0.0040	0.006	0.237	-	-	0.096	0.005	-	-	-	-	-	-	-
49	294	0.0050	0.008	0.245	-	-	0.102	0.006	-	-	-	-	-	-	-
50	300	0.0040	0.006	0.251	-	-	0.107	0.005	-	-	-	-	-	-	-
51	306	0.0050	0.008	0.259	-	-	0.113	0.006	-	-	-	-	-	-	-
52	312	0.0040	0.006	0.266	-	-	0.118	0.005	-	-	-	-	-	-	-
53	318	0.0050	0.008	0.274	-	-	0.124	0.006	-	-	-	-	-	-	-
54	324	0.0050	0.008	0.282	-	-	0.130	0.006	-	-	-	-	-	-	-
55	330	0.0050	0.008	0.290	-	-	0.137	0.006	-	-	-	-	-	-	-
56	336	0.0050	0.008	0.298	-	-	0.143	0.006	-	-	-	-	-	-	-
57	342	0.0050	0.008	0.306	-	-	0.150	0.006	-	-	-	-	-	-	-
58	348	0.0050	0.008	0.314	-	-	0.156	0.007	-	-	-	-	-	-	-
59	354	0.0050	0.008	0.322	-	-	0.163	0.007	-	-	-	-	-	-	-
60	360	0.0060	0.010	0.331	-	-	0.171	0.008	-	-	-	-	-	-	-
61	366	0.0060	0.010	0.341	-	-	0.179	0.008	-	-	-	-	-	-	-
62	372	0.0060	0.010	0.350	-	-	0.187	0.008	-	-	-	-	-	-	-
63	378	0.0060	0.010	0.360	-	-	0.195	0.008	-	-	-	-	-	-	-
64	384	0.0070	0.011	0.371	-	-	0.204	0.010	-	-	-	-	-	-	-
65	390	0.0060	0.010	0.381	-	-	0.212	0.008	-	-	-	-	-	-	-
66	396	0.0060	0.010	0.390	-	-	0.221	0.008	-	-	-	-	-	-	-
67	402	0.0060	0.010	0.400	-	-	0.229	0.008	-	-	-	-	-	-	-
68	408	0.0060	0.010	0.410	-	-	0.237	0.008	-	-	-	-	-	-	-
69	414	0.0060	0.010	0.419	-	-	0.246	0.008	-	-	-	-	-	-	-
70	420	0.0070	0.011	0.430	-	-	0.256	0.010	-	-	-	-	-	-	-
71	426	0.0070	0.011	0.442	-	-	0.266	0.010	-	-	-	-	-	-	-
72	432	0.0080	0.013	0.454	-	-	0.277	0.011	-	-	-	-	-	-	-
73	438	0.0080	0.013	0.467	-	-	0.288	0.011	-	-	-	-	-	-	-
74	444	0.0090	0.014	0.482	-	-	0.301	0.013	-	-	-	-	-	-	-
75	450	0.0100	0.016	0.498	-	-	0.316	0.014	-	-	-	-	-	-	-
76	456	0.0210	0.034	0.531	-	-	0.346	0.031	-	-	-	-	-	-	-
77	462	0.0240	0.038	0.570	-	-	0.382	0.035	-	-	-	-	-	-	-
78	468	0.0240	0.038	0.608	-	-	0.417	0.036	-	-	-	-	-	-	-
79	474	0.0240	0.038	0.646	-	-	0.453	0.036	-	-	-	-	-	-	-
80	480	0.0220	0.035	0.682	-	-	0.486	0.033	-	-	-	-	-	-	-
81	486	0.0140	0.022	0.704	0.000	0.000	0.507	0.021	0.000	0.00	0.000	0.0	-	0.00	0
82	492	0.0130	0.021	0.725	0.000	0.000	0.527	0.020	0.000	0.09	0.005	1.9	-	0.96	1
83	498	0.0100	0.016	0.741	0.000	0.000	0.542	0.015	0.000	0.18	0.020	9.2	-	4.61	6
84	504	0.0100	0.016	0.757	0.001	0.000	0.557	0.015	0.000	0.27	0.044	25.1	-	11.59	17
85	510	0.0080	0.013	0.770	0.001	0.000	0.569	0.012	0.000	0.29	0.071	50.7	-	20.75	38
86	516	0.0090	0.014	0.784	0.002	0.001	0.583	0.014	0.001	0.39	0.102	87.4	-	31.17	69
87	522	0.0090	0.014	0.798	0.003	0.001	0.597	0.014	0.001	0.47	0.140	137.7	-	43.47	113
88	528	0.0070	0.011	0.810	0.003	0.001	0.608	0.011	0.001	0.41	0.174	200.3	-	56.42	169
89	534	0.0080	0.013	0.822	0.004	0.001	0.620	0.012	0.001	0.52	0.208	275.1	-	68.70	238
90	540	0.0070	0.011	0.834	0.005	0.001	0.630	0.011	0.001	0.51	0.243	362.6	-	81.14	319
91	546	0.0070	0.011	0.845	0.006	0.001	0.641	0.011	0.001	0.55	0.276	461.7	-	93.34	412
92	552	0.0060	0.010	0.854	0.006	0.001	0.650	0.009	0.001	0.50	0.304	571.3	-	104.36	517
93	558	0.0060	0.010	0.864	0.007	0.001	0.660	0.009	0.001	0.53	0.329	689.7	-	113.96	630

Area 2 - Existing

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
					Pervious Area		Impervious Area								
Time Increment t	Elapsed Time	Rainfall Distr.	Incremental Rainfall P(t)	Accumulated Rainfall P	Accumulated Runoff	Incremental Runoff D_{perv} (t)	Accumulated Runoff	Incremental Runoff D_{imp}(t)	Total Runoff D(t)	Instant Flow Rate I(t)	Design Flow Rate Q(t)	Accumulated Runoff	Infiltration Rate O(t)	Change in Storage	Storage
	(minutes)	(fraction)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(cfs)	(cfs)	(cf)	(cfs)	(cf)	(cf)
94	564	0.0060	0.010	0.874	0.008	0.001	0.669	0.009	0.001	0.56	0.354	817.2	-	122.94	753
95	570	0.0050	0.008	0.882	0.009	0.001	0.677	0.008	0.001	0.49	0.374	951.9	-	131.11	885
96	576	0.0060	0.010	0.891	0.010	0.001	0.686	0.009	0.001	0.62	0.395	1,094.2	-	138.50	1,023
97	582	0.0050	0.008	0.899	0.010	0.001	0.694	0.008	0.001	0.54	0.416	1,244.0	-	146.08	1,169
98	588	0.0060	0.010	0.909	0.011	0.001	0.703	0.009	0.001	0.67	0.438	1,401.8	-	153.83	1,323
99	594	0.0050	0.008	0.917	0.012	0.001	0.710	0.008	0.001	0.58	0.460	1,567.5	-	161.72	1,485
100	600	0.0050	0.008	0.925	0.013	0.001	0.718	0.008	0.001	0.60	0.476	1,738.7	-	168.46	1,653
101	606	0.0050	0.008	0.933	0.014	0.001	0.726	0.008	0.001	0.63	0.492	1,915.7	-	174.12	1,827
102	612	0.0050	0.008	0.941	0.015	0.001	0.734	0.008	0.001	0.65	0.508	2,098.7	-	179.97	2,007
103	618	0.0050	0.008	0.949	0.016	0.001	0.741	0.008	0.001	0.67	0.525	2,287.7	-	185.97	2,193
104	624	0.0040	0.006	0.955	0.017	0.001	0.748	0.006	0.001	0.55	0.534	2,480.0	-	190.68	2,384
105	630	0.0050	0.008	0.963	0.018	0.001	0.755	0.008	0.001	0.70	0.545	2,676.1	-	194.19	2,578
106	636	0.0050	0.008	0.971	0.019	0.001	0.763	0.008	0.001	0.72	0.564	2,879.0	-	199.47	2,778
107	642	0.0040	0.006	0.978	0.020	0.001	0.769	0.006	0.001	0.59	0.574	3,085.6	-	204.79	2,982
108	648	0.0050	0.008	0.986	0.021	0.001	0.777	0.008	0.001	0.76	0.585	3,296.4	-	208.72	3,191
109	654	0.0050	0.008	0.994	0.022	0.001	0.785	0.008	0.001	0.77	0.606	3,514.6	-	214.47	3,405
110	660	0.0040	0.006	1.000	0.023	0.001	0.791	0.006	0.001	0.63	0.617	3,736.8	-	220.20	3,626
111	666	0.0040	0.006	1.006	0.024	0.001	0.797	0.006	0.001	0.65	0.620	3,959.9	-	222.68	3,848
112	672	0.0050	0.008	1.014	0.025	0.001	0.805	0.008	0.001	0.82	0.633	4,187.8	-	225.52	4,074
113	678	0.0040	0.006	1.021	0.026	0.001	0.811	0.006	0.001	0.67	0.646	4,420.5	-	230.27	4,304
114	684	0.0040	0.006	1.027	0.027	0.001	0.817	0.006	0.001	0.68	0.650	4,654.5	-	233.33	4,537
115	690	0.0040	0.006	1.034	0.028	0.001	0.824	0.006	0.001	0.70	0.655	4,890.2	-	234.84	4,772
116	696	0.0040	0.006	1.040	0.030	0.001	0.830	0.006	0.001	0.71	0.660	5,127.8	-	236.67	5,009
117	702	0.0040	0.006	1.046	0.031	0.001	0.836	0.006	0.001	0.72	0.666	5,367.7	-	238.78	5,248
118	708	0.0040	0.006	1.053	0.032	0.001	0.842	0.006	0.001	0.73	0.673	5,610.1	-	241.13	5,489
119	714	0.0030	0.005	1.058	0.033	0.001	0.847	0.005	0.001	0.56	0.670	5,851.3	-	241.77	5,731
120	720	0.0040	0.006	1.064	0.034	0.001	0.853	0.006	0.001	0.75	0.668	6,091.8	-	240.86	5,972
121	726	0.0040	0.006	1.070	0.035	0.001	0.859	0.006	0.001	0.76	0.679	6,336.1	-	242.40	6,214
122	732	0.0030	0.005	1.075	0.036	0.001	0.864	0.005	0.001	0.58	0.678	6,580.1	-	244.13	6,458
123	738	0.0040	0.006	1.082	0.037	0.001	0.870	0.006	0.001	0.78	0.678	6,824.3	-	244.10	6,702
124	744	0.0040	0.006	1.088	0.038	0.001	0.876	0.006	0.001	0.80	0.691	7,073.1	-	246.50	6,949
125	750	0.0040	0.006	1.094	0.039	0.001	0.883	0.006	0.001	0.81	0.704	7,326.4	-	251.08	7,200
126	756	0.0040	0.006	1.101	0.041	0.001	0.889	0.006	0.001	0.82	0.716	7,584.3	-	255.61	7,455
127	762	0.0030	0.005	1.106	0.041	0.001	0.894	0.005	0.001	0.62	0.717	7,842.3	-	257.93	7,713
128	768	0.0040	0.006	1.112	0.043	0.001	0.900	0.006	0.001	0.84	0.718	8,100.8	-	258.26	7,972
129	774	0.0030	0.005	1.117	0.044	0.001	0.904	0.005	0.001	0.64	0.720	8,360.1	-	258.91	8,230
130	780	0.0040	0.006	1.123	0.045	0.001	0.911	0.006	0.001	0.86	0.723	8,620.5	-	259.84	8,490
131	786	0.0040	0.006	1.130	0.046	0.001	0.917	0.006	0.001	0.87	0.739	8,886.7	-	263.27	8,754
132	792	0.0030	0.005	1.134	0.047	0.001	0.922	0.005	0.001	0.66	0.742	9,153.8	-	266.66	9,020
133	798	0.0040	0.006	1.141	0.049	0.001	0.928	0.006	0.001	0.89	0.746	9,422.3	-	267.80	9,288
134	804	0.0040	0.006	1.147	0.050	0.001	0.934	0.006	0.001	0.90	0.763	9,696.8	-	271.49	9,560
135	810	0.0030	0.005	1.152	0.051	0.001	0.939	0.005	0.001	0.68	0.766	9,972.5	-	275.11	9,835
136	816	0.0030	0.005	1.157	0.052	0.001	0.943	0.005	0.001	0.69	0.756	10,244.8	-	273.98	10,109
137	822	0.0040	0.006	1.163	0.053	0.001	0.950	0.006	0.001	0.93	0.762	10,519.1	-	273.33	10,382
138	828	0.0030	0.005	1.168	0.054	0.001	0.954	0.005	0.001	0.70	0.768	10,795.6	-	275.43	10,657
139	834	0.0040	0.006	1.174	0.056	0.001	0.961	0.006	0.001	0.94	0.774	11,074.4	-	277.63	10,935
140	840	0.0030	0.005	1.179	0.057	0.001	0.965	0.005	0.001	0.72	0.781	11,355.5	-	279.91	11,215
141	846	0.0030	0.005	1.184	0.058	0.001	0.970	0.005	0.001	0.72	0.774	11,633.9	-	279.77	11,495
142	852	0.0040	0.006	1.190	0.059	0.001	0.976	0.006	0.001	0.97	0.782	11,915.4	-	279.98	11,775
143	858	0.0030	0.005	1.195	0.061	0.001	0.981	0.005	0.001	0.74	0.790	12,199.8	-	282.95	12,058
144	864	0.0030	0.005	1.200	0.062	0.001	0.986	0.005	0.001	0.74	0.784	12,482.1	-	283.35	12,341
145	870	0.0040	0.006	1.206	0.063	0.001	0.992	0.006	0.001	1.00	0.794	12,767.9	-	284.03	12,625
146	876	0.0030	0.005	1.211	0.064	0.001	0.997	0.005	0.001	0.75	0.803	13,057.1	-	287.49	12,912
147	882	0.0030	0.005	1.216	0.065	0.001	1.001	0.005	0.001	0.76	0.798	13,344.4	-	288.24	13,201
148	888	0.0040	0.006	1.222	0.067	0.002	1.008	0.006	0.002	1.02	0.809	13,635.6	-	289.24	13,490
149	894	0.0030	0.005	1.227	0.068	0.001	1.012	0.005	0.001	0.77	0.819	13,930.4	-	293.03	13,783
150	900	0.0030	0.005	1.232	0.069	0.001	1.017	0.005	0.001	0.78	0.814	14,223.6	-	294.01	14,077
151	906	0.0030	0.005	1.237	0.070	0.001	1.022	0.005	0.001	0.79	0.811	14,515.4	-	292.49	14,370
152	912	0.0040	0.006	1.243	0.072	0.002	1.028	0.006	0.002	1.06	0.823	14,811.8	-	294.11	14,664
153	918	0.0030	0.005	1.248	0.073	0.001	1.033	0.005	0.001	0.80	0.835	15,112.5	-	298.55	14,952
154	924	0.0030	0.005	1.253	0.074	0.001	1.037	0.005	0.001	0.80	0.831	15,411.8	-	300.01	15,262
155	930	0.0030	0.005	1.258	0.076	0.001	1.042	0.005	0.001	0.81	0.829	15,710.2	-	298.82	15,561
156	936	0.0030	0.005	1.262	0.077	0.001	1.047	0.005	0.001	0.82	0.827	16,007.8	-	298.00	15,859
157	942	0.0040	0.006	1.269	0.079	0.002	1.053	0.006	0.002	1.10	0.842	16,310.8	-	300.34	16,159
158	948	0.0030	0.005	1.274	0.080	0.001	1.058	0.005	0.001	0.83	0.856	16,618.9	-	305.52	16,465
159	954	0.0030	0.005	1.278	0.081	0.001	1.062	0.005	0.001	0.83	0.853	16,925.9	-	307.52	16,772
160	960	0.0030	0.005	1.283	0.082	0.001	1.067	0.005	0.001	0.84	0.851	17,232.3	-	306.70	17,079
161	966	0.0030	0.005	1.288	0.084	0.001	1.072	0.005	0.001	0.85	0.850	17,538.3	-	306.21	17,385
162	972	0.0030	0.005	1.293	0.085	0.001	1.077	0.005	0.001	0.85	0.850	17,844.3	-	306.00	17,691
163	978	0.0030	0.005	1.298	0.086	0.001	1.081	0.005	0.001	0.86	0.850	18,150.4	-	306.04	17,997
164	984	0.0030	0.005	1.302	0.087	0.001	1.086	0.005	0.001	0.86	0.851	18,456.9	-	306.30	18,304
165	990	0.0030	0.005	1.307	0.089	0.001	1.091	0.005	0.001	0.87	0.853	18,763.9	-	306.76	18,610
166	996	0.0030	0.005	1.312	0.090	0.001	1.095	0.005	0.001	0.87	0.855	19,071.7	-	307.39	18,918
167	1002	0.0030	0.005	1.317	0.091	0.001	1.100	0.005	0.001	0.88	0.857	19,380.3	-	308.18	19,226
168	1008	0.0030	0.005	1.322	0.093	0.001	1.105	0.005	0.001	0.88	0.860	19,689.9	-	309.10	19,535
169	1014	0.0030	0.005	1.326	0.094	0.001	1.109	0.005	0.001	0.89	0.863	20,000.5	-	310.13	19,845
170	1020	0.0030	0.005	1.331	0.095	0.001	1.114	0.005	0.001	0.89	0.866	20,312.4	-	311.27	20,156
171	1026	0.0030	0.005	1.336	0.097	0.001	1.119	0.005	0.001	0.90	0.870	20,625.5	-	312.50	20,469

Area 2 - Existing

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
					Pervious Area		Impervious Area								
Time Increment t	Elapsed Time	Rainfall Distr.	Incremental Rainfall P(t)	Accumulated Rainfall P	Accumulated Runoff	Incremental Runoff D_{perv} (t)	Accumulated Runoff	Incremental Runoff D_{imp}(t)	Total Runoff D(t)	Instant Flow Rate I(t)	Design Flow Rate Q(t)	Accumulated Runoff	Infiltration Rate O(t)	Change in Storage	Storage
	(minutes)	(fraction)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(cfs)	(cfs)	(cf)	(cfs)	(cf)	(cf)
172	1032	0.0030	0.005	1.341	0.098	0.001	1.124	0.005	0.001	0.91	0.874	20,940.0	-	313.80	20,783
173	1038	0.0030	0.005	1.346	0.099	0.001	1.128	0.005	0.001	0.91	0.877	21,255.9	-	315.18	21,098
174	1044	0.0030	0.005	1.350	0.101	0.001	1.133	0.005	0.001	0.92	0.882	21,573.2	-	316.62	21,415
175	1050	0.0030	0.005	1.355	0.102	0.001	1.138	0.005	0.001	0.92	0.886	21,892.1	-	318.11	21,733
176	1056	0.0030	0.005	1.360	0.104	0.001	1.142	0.005	0.001	0.93	0.890	22,212.5	-	319.65	22,052
177	1062	0.0020	0.003	1.363	0.105	0.001	1.146	0.003	0.001	0.62	0.877	22,528.1	-	318.01	22,370
178	1068	0.0030	0.005	1.368	0.106	0.001	1.150	0.005	0.001	0.93	0.865	22,839.6	-	313.55	22,684
179	1074	0.0030	0.005	1.373	0.107	0.001	1.155	0.005	0.001	0.94	0.874	23,154.1	-	312.99	22,997
180	1080	0.0030	0.005	1.378	0.109	0.001	1.160	0.005	0.001	0.95	0.881	23,471.4	-	315.91	23,313
181	1086	0.0030	0.005	1.382	0.110	0.001	1.164	0.005	0.001	0.95	0.889	23,791.5	-	318.70	23,631
182	1092	0.0020	0.003	1.386	0.111	0.001	1.168	0.003	0.001	0.64	0.878	24,107.6	-	318.09	23,950
183	1098	0.0030	0.005	1.390	0.113	0.001	1.172	0.005	0.001	0.96	0.869	24,420.4	-	314.45	24,264
184	1104	0.0030	0.005	1.395	0.114	0.001	1.177	0.005	0.001	0.96	0.879	24,737.0	-	314.70	24,579
185	1110	0.0030	0.005	1.400	0.115	0.001	1.182	0.005	0.001	0.97	0.889	25,057.2	-	318.41	24,897
186	1116	0.0020	0.003	1.403	0.116	0.001	1.185	0.003	0.001	0.65	0.880	25,374.1	-	318.55	25,216
187	1122	0.0030	0.005	1.408	0.118	0.001	1.190	0.005	0.001	0.98	0.873	25,688.2	-	315.50	25,531
188	1128	0.0030	0.005	1.413	0.119	0.001	1.194	0.005	0.001	0.98	0.885	26,006.8	-	316.34	25,848
189	1134	0.0020	0.003	1.416	0.120	0.001	1.197	0.003	0.001	0.66	0.877	26,322.7	-	317.22	26,165
190	1140	0.0030	0.005	1.421	0.122	0.001	1.202	0.005	0.001	0.99	0.871	26,636.4	-	314.79	26,480
191	1146	0.0030	0.005	1.426	0.123	0.001	1.207	0.005	0.001	1.00	0.885	26,955.1	-	316.22	26,796
192	1152	0.0020	0.003	1.429	0.124	0.001	1.210	0.003	0.001	0.67	0.879	27,271.6	-	317.62	27,113
193	1158	0.0030	0.005	1.434	0.126	0.002	1.215	0.005	0.002	1.00	0.874	27,586.3	-	315.60	27,429
194	1164	0.0020	0.003	1.437	0.127	0.001	1.218	0.003	0.001	0.67	0.870	27,899.5	-	313.96	27,743
195	1170	0.0030	0.005	1.442	0.128	0.002	1.223	0.005	0.002	1.01	0.867	28,211.6	-	312.64	28,056
196	1176	0.0030	0.005	1.446	0.130	0.002	1.227	0.005	0.002	1.02	0.884	28,529.8	-	315.13	28,371
197	1182	0.0020	0.003	1.450	0.131	0.001	1.231	0.003	0.001	0.68	0.880	28,846.6	-	317.48	28,688
198	1188	0.0030	0.005	1.454	0.132	0.002	1.235	0.005	0.002	1.03	0.877	29,162.2	-	316.21	29,004
199	1194	0.0020	0.003	1.458	0.134	0.001	1.238	0.003	0.001	0.69	0.874	29,477.0	-	315.23	29,320
200	1200	0.0030	0.005	1.462	0.135	0.002	1.243	0.005	0.002	1.03	0.873	29,791.2	-	314.51	29,634
201	1206	0.0020	0.003	1.466	0.136	0.001	1.246	0.003	0.001	0.69	0.872	30,105.0	-	314.00	29,948
202	1212	0.0030	0.005	1.470	0.138	0.002	1.251	0.005	0.002	1.04	0.871	30,418.6	-	313.70	30,262
203	1218	0.0020	0.003	1.474	0.139	0.001	1.254	0.003	0.001	0.70	0.871	30,732.2	-	313.57	30,575
204	1224	0.0020	0.003	1.477	0.140	0.001	1.257	0.003	0.001	0.70	0.851	31,038.6	-	309.97	30,885
205	1230	0.0030	0.005	1.482	0.141	0.002	1.262	0.005	0.002	1.05	0.854	31,346.0	-	306.92	31,192
206	1236	0.0020	0.003	1.485	0.142	0.001	1.265	0.003	0.001	0.70	0.857	31,654.5	-	307.95	31,500
207	1242	0.0030	0.005	1.490	0.144	0.002	1.270	0.005	0.002	1.06	0.860	31,964.0	-	309.00	31,809
208	1248	0.0020	0.003	1.493	0.145	0.001	1.273	0.003	0.001	0.71	0.863	32,274.6	-	310.07	32,119
209	1254	0.0020	0.003	1.496	0.146	0.001	1.276	0.003	0.001	0.71	0.845	32,579.0	-	307.47	32,427
210	1260	0.0030	0.005	1.501	0.148	0.002	1.281	0.005	0.002	1.07	0.851	32,885.2	-	305.30	32,732
211	1266	0.0020	0.003	1.504	0.149	0.001	1.284	0.003	0.001	0.72	0.856	33,193.3	-	307.18	33,039
212	1272	0.0020	0.003	1.507	0.150	0.001	1.287	0.003	0.001	0.72	0.840	33,495.7	-	305.25	33,345
213	1278	0.0030	0.005	1.512	0.152	0.002	1.292	0.005	0.002	1.08	0.847	33,800.7	-	303.68	33,648
214	1284	0.0020	0.003	1.515	0.153	0.001	1.295	0.003	0.001	0.72	0.854	34,108.0	-	306.12	33,954
215	1290	0.0020	0.003	1.518	0.154	0.001	1.298	0.003	0.001	0.73	0.839	34,410.0	-	304.65	34,259
216	1296	0.0030	0.005	1.523	0.155	0.002	1.303	0.005	0.002	1.09	0.847	34,714.9	-	303.49	34,562
217	1302	0.0020	0.003	1.526	0.156	0.001	1.306	0.003	0.001	0.73	0.855	35,022.6	-	306.33	34,869
218	1308	0.0020	0.003	1.530	0.158	0.001	1.309	0.003	0.001	0.73	0.841	35,325.3	-	305.18	35,174
219	1314	0.0020	0.003	1.533	0.159	0.001	1.312	0.003	0.001	0.74	0.829	35,623.6	-	300.48	35,474
220	1320	0.0020	0.003	1.536	0.160	0.001	1.316	0.003	0.001	0.74	0.818	35,918.1	-	296.40	35,771
221	1326	0.0021	0.003	1.539	0.161	0.001	1.319	0.003	0.001	0.78	0.811	36,210.1	-	293.27	36,064
222	1332	0.0020	0.003	1.543	0.162	0.001	1.322	0.003	0.001	0.74	0.805	36,500.0	-	290.96	36,355
223	1338	0.0020	0.003	1.546	0.163	0.001	1.325	0.003	0.001	0.74	0.798	36,787.4	-	288.62	36,644
224	1344	0.0020	0.003	1.549	0.164	0.001	1.328	0.003	0.001	0.75	0.792	37,072.5	-	286.25	36,930
225	1350	0.0020	0.003	1.552	0.165	0.001	1.332	0.003	0.001	0.75	0.787	37,355.8	-	284.24	37,214
226	1356	0.0020	0.003	1.555	0.167	0.001	1.335	0.003	0.001	0.75	0.783	37,637.6	-	282.54	37,497
227	1362	0.0020	0.003	1.559	0.168	0.001	1.338	0.003	0.001	0.75	0.779	37,918.1	-	281.12	37,778
228	1368	0.0020	0.003	1.562	0.169	0.001	1.341	0.003	0.001	0.75	0.776	38,197.5	-	279.95	38,058
229	1374	0.0020	0.003	1.565	0.170	0.001	1.344	0.003	0.001	0.76	0.774	38,476.1	-	278.99	38,337
230	1380	0.0020	0.003	1.568	0.171	0.001	1.347	0.003	0.001	0.76	0.772	38,754.0	-	278.23	38,615
231	1386	0.0020	0.003	1.571	0.172	0.001	1.350	0.003	0.001	0.76	0.771	39,031.3	-	277.64	38,893
232	1392	0.0020	0.003	1.575	0.173	0.001	1.354	0.003	0.001	0.76	0.769	39,308.4	-	277.20	39,170
233	1398	0.0020	0.003	1.578	0.174	0.001	1.357	0.003	0.001	0.76	0.769	39,585.1	-	276.89	39,447
234	1404	0.0020	0.003	1.581	0.176	0.001	1.360	0.003	0.001	0.77	0.768	39,861.8	-	276.71	39,723
235	1410	0.0020	0.003	1.584	0.177	0.001	1.363	0.003	0.001	0.77	0.768	40,138.4	-	276.62	40,000
236	1416	0.0020	0.003	1.587	0.178	0.001	1.366	0.003	0.001	0.77	0.768	40,415.0	-	276.63	40,277
237	1422	0.0020	0.003	1.591	0.179	0.001	1.369	0.003	0.001	0.77	0.769	40,691.8	-	276.72	40,553
238	1428	0.0020	0.003	1.594	0.180	0.001	1.373	0.003	0.001	0.77	0.769	40,968.8	-	276.88	40,830
239	1434	0.0020	0.003	1.597	0.181	0.001	1.376	0.003	0.001	0.78	0.770	41,246.0	-	277.10	41,107
240	1440	0.0020	0.003	1.600	0.183	0.001	1.379	0.003	0.001	0.78	0.771	41,523.5	-	277.38	41,385

Area 2 - Proposed

Storm: 25Yr 24Hr

SCS Type 1A Storm Hyetograph Values

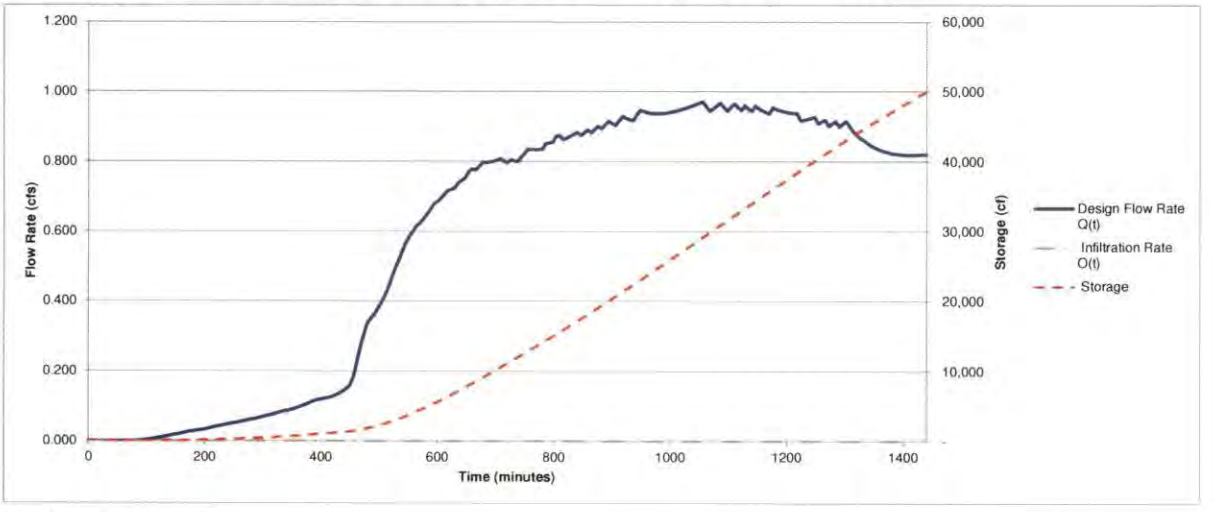
Santa Barbara Urban Hydrograph Method

Drainage Basin Area, A =	66.09	acres	Abstract Runoff Value, S =	(1000/CN) - 10	
Total Rainfall, P25yr24hr =	1.6	inches	Runoff Curve Number, CN =	per Table 4.5.2	
Time Increment, dt =	6	minutes	Routing Constant, w =	dt/(2*Tc + dt)	
Time of Concentration, Tc =	49.3	minutes	w =	0.057	
Total Infiltration Rate =	-	cfs			

Summary

Peak Design Flow =	0.972	cfs
Required Storage =	49,991	cf
Peak Hour Runoff =	3,455	cf

Pervious Area:	A_{perv}=	64.43	acres	CN_{perv} =	74.320665	S_{perv} =	3.46	$0.2*S_{perv}$ =	0.69
Impervious Area:	A_{imp}=	1.65	acres	CN_{imp} =	98	S_{imp} =	0.20	$0.2*S_{imp}$ =	0.04



Column Description and Formula

1 Time Step or Increment, t
2 Elapsed Time (minutes)
3 Rainfall Distribution, Type 1A Storm from Table 4.2.2
4 Incremental Rainfall, P(t) = Column 3 * P
5 Accumulated Rainfall, P = Accumulated Sum of Column 4
6 Accumulated Runoff Depth Pervious Area — If $P \le 0.2*S_{perv}$, then = 0; otherwise, If $P > 0.2*S_{perv}$, then = $(P - 0.2*S_{perv})^2/(P + 0.8*S_{perv})$
7 Incremental Runoff Depth, $D_{perv}(t)$ = Column 6 of present step - Column 6 of prevous step
8 Accumulated Runoff Depth Impervious Area — If $P \le 0.2S_{imp}$, then = 0; otherwise, If $P > 0.2S_{imp}$, then = $(P - 0.2*S_{imp})^2/(P + 0.8*S_{imp})$
9 Incremental Runoff Depth, $D_{imp}(t)$ = Column 7 of present step - Column 7 of prevous step
10 Total Runoff Depth, $D(t) = (A_{perv}/A)*D_{perv}(t) + (A_{imp}/A)- D_{imp}(t)$
11 Instantaneaous Hydrograph Flow Rate, I(t) = 60.5*D(t) * A/dt
12 Design Flow Rate, Q(t+1) = Q(t) + w*[I(t) + I(t+1) - 2*Q(t)]
13 Accumulated Runoff = Q(t)*dt*60 sec/min + Column 13 of previous step
14 Infiltration Rate = (Ksat/(12* 3600)) * AI
15 Change in Storage = dt * [[(I(t)+I(t-1))/2] - [(O(t)+O(t-1))/2]]
16 Storage = Storage from previous step plus change in storage

Area 2 - Proposed

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
					Pervious Area		Impervious Area								
Time Increment t	Elapsed Time	Rainfall Distr.	Incremental Rainfall P(t)	Accumulated Rainfall P	Accumulated Runoff	Incremental Runoff D_{perv} (t)	Accumulated Runoff	Incremental Runoff $D_{imp}(t)$	Total Runoff D(t)	Instant Flow Rate I(t)	Design Flow Rate Q(t)	Accumulated Runoff	Infiltration Rate O(t)	Change in Storage	Storage
	(minutes)	(fraction)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(cfs)	(cfs)	(cf)	(cfs)	(cf)	(cf)
0	0		-	-	-	-	-	-	-	-	-	-	-	-	-
1	6	0.0020	0.003	0.003	-	-	-	-	-	-	-	-	-	-	-
2	12	0.0020	0.003	0.006	-	-	-	-	-	-	-	-	-	-	-
3	18	0.0020	0.003	0.010	-	-	-	-	-	-	-	-	-	-	-
4	24	0.0020	0.003	0.013	-	-	-	-	-	-	-	-	-	-	-
5	30	0.0020	0.003	0.016	-	-	-	-	-	-	-	-	-	-	-
6	36	0.0020	0.003	0.019	-	-	-	-	-	-	-	-	-	-	-
7	42	0.0020	0.003	0.022	-	-	-	-	-	-	-	-	-	-	-
8	48	0.0020	0.003	0.026	-	-	-	-	-	-	-	-	-	-	-
9	54	0.0020	0.003	0.029	-	-	-	-	-	-	-	-	-	-	-
10	60	0.0020	0.003	0.032	-	-	-	-	-	-	-	-	-	-	-
11	66	0.0030	0.005	0.037	-	-	-	-	-	-	-	-	-	-	-
12	72	0.0030	0.005	0.042	-	-	0.000	0.000	0.000	0.00	0.000	0.0	-	0.00	0
13	78	0.0030	0.005	0.046	-	-	0.000	0.000	0.000	0.00	0.000	0.1	-	0.03	0
14	84	0.0030	0.005	0.051	-	-	0.001	0.000	0.000	0.01	0.001	0.3	-	0.14	0
15	90	0.0030	0.005	0.056	-	-	0.001	0.001	0.000	0.01	0.001	0.8	-	0.36	1

Area 2 - Proposed

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
					Pervious Area		Impervious Area								
Time Increment t	Elapsed Time	Rainfall Distr.	Incremental Rainfall P(t)	Accumulated Rainfall P	Accumulated Runoff	Incremental Runoff D_{perv} (t)	Accumulated Runoff	Incremental Runoff D_{imp}(t)	Total Runoff D(t)	Instant Flow Rate I(t)	Design Flow Rate Q(t)	Accumulated Runoff	Infiltration Rate O(t)	Change in Storage	Storage
	(minutes)	(fraction)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(cfs)	(cfs)	(cf)	(cfs)	(cf)	(cf)
16	96	0.0030	0.005	0.061	-	-	0.002	0.001	0.000	0.01	0.002	1.7	-	0.70	1
17	102	0.0030	0.005	0.066	-	-	0.003	0.001	0.000	0.02	0.004	3.0	-	1.12	2
18	108	0.0030	0.005	0.070	-	-	0.004	0.001	0.000	0.02	0.005	4.9	-	1.61	4
19	114	0.0030	0.005	0.075	-	-	0.005	0.001	0.000	0.02	0.007	7.3	-	2.15	6
20	120	0.0030	0.005	0.080	-	-	0.006	0.001	0.000	0.02	0.008	10.4	-	2.74	9
21	126	0.0030	0.005	0.085	-	-	0.008	0.001	0.000	0.02	0.010	14.0	-	3.36	12
22	132	0.0030	0.005	0.090	-	-	0.009	0.002	0.000	0.03	0.012	18.3	-	3.99	16
23	138	0.0040	0.006	0.096	-	-	0.012	0.002	0.000	0.04	0.014	23.5	-	4.75	21
24	144	0.0030	0.005	0.101	-	-	0.014	0.002	0.000	0.03	0.017	29.6	-	5.61	27
25	150	0.0030	0.005	0.106	-	-	0.016	0.002	0.000	0.03	0.019	36.2	-	6.36	33
26	156	0.0030	0.005	0.110	-	-	0.018	0.002	0.000	0.03	0.020	43.6	-	6.99	40
27	162	0.0030	0.005	0.115	-	-	0.020	0.002	0.000	0.04	0.022	51.5	-	7.62	48
28	168	0.0040	0.006	0.122	-	-	0.023	0.003	0.000	0.05	0.025	60.3	-	8.38	56
29	174	0.0030	0.005	0.126	-	-	0.025	0.002	0.000	0.04	0.027	70.0	-	9.25	65
30	180	0.0030	0.005	0.131	-	-	0.028	0.002	0.000	0.04	0.028	80.2	-	9.95	75
31	186	0.0030	0.005	0.136	-	-	0.030	0.003	0.000	0.04	0.030	91.0	-	10.50	86
32	192	0.0030	0.005	0.141	-	-	0.033	0.003	0.000	0.04	0.031	102.3	-	11.04	97
33	198	0.0030	0.005	0.146	-	-	0.036	0.003	0.000	0.04	0.033	114.1	-	11.56	108
34	204	0.0040	0.006	0.152	-	-	0.039	0.004	0.000	0.06	0.035	126.8	-	12.24	120
35	210	0.0030	0.005	0.157	-	-	0.042	0.003	0.000	0.05	0.037	140.2	-	13.04	133
36	216	0.0040	0.006	0.163	-	-	0.046	0.004	0.000	0.06	0.039	154.4	-	13.81	147
37	222	0.0040	0.006	0.170	-	-	0.050	0.004	0.000	0.07	0.042	169.6	-	14.71	162
38	228	0.0030	0.005	0.174	-	-	0.053	0.003	0.000	0.05	0.044	185.5	-	15.57	178
39	234	0.0040	0.006	0.181	-	-	0.057	0.004	0.000	0.07	0.046	202.0	-	16.21	194
40	240	0.0040	0.006	0.187	-	-	0.061	0.004	0.000	0.07	0.049	219.5	-	17.00	211
41	246	0.0030	0.005	0.192	-	-	0.064	0.003	0.000	0.05	0.050	237.5	-	17.75	229
42	252	0.0040	0.006	0.198	-	-	0.069	0.004	0.000	0.07	0.051	256.1	-	18.28	247
43	258	0.0040	0.006	0.205	-	-	0.073	0.004	0.000	0.07	0.054	275.5	-	18.98	266
44	264	0.0040	0.006	0.211	-	-	0.078	0.004	0.000	0.07	0.056	295.7	-	19.83	286
45	270	0.0040	0.006	0.218	-	-	0.082	0.005	0.000	0.08	0.058	316.8	-	20.63	306
46	276	0.0040	0.006	0.224	-	-	0.087	0.005	0.000	0.08	0.060	338.5	-	21.38	328
47	282	0.0040	0.006	0.230	-	-	0.091	0.005	0.000	0.08	0.062	360.9	-	22.09	350
48	288	0.0040	0.006	0.237	-	-	0.096	0.005	0.000	0.08	0.064	384.0	-	22.76	372
49	294	0.0050	0.008	0.245	-	-	0.102	0.006	0.000	0.10	0.067	408.1	-	23.59	396
50	300	0.0040	0.006	0.251	-	-	0.107	0.005	0.000	0.08	0.070	433.2	-	24.58	421
51	306	0.0050	0.008	0.259	-	-	0.113	0.006	0.000	0.10	0.072	459.1	-	25.49	446
52	312	0.0040	0.006	0.266	-	-	0.118	0.005	0.000	0.08	0.074	485.9	-	26.35	472
53	318	0.0050	0.008	0.274	-	-	0.124	0.006	0.000	0.10	0.076	513.4	-	27.14	500
54	324	0.0050	0.008	0.282	-	-	0.130	0.006	0.000	0.10	0.080	542.1	-	28.10	528
55	330	0.0050	0.008	0.290	-	-	0.137	0.006	0.000	0.11	0.083	571.8	-	29.20	557
56	336	0.0050	0.008	0.298	-	-	0.143	0.006	0.000	0.11	0.085	602.5	-	30.22	587
57	342	0.0050	0.008	0.306	-	-	0.150	0.006	0.000	0.11	0.088	634.1	-	31.16	618
58	348	0.0050	0.008	0.314	-	-	0.156	0.007	0.000	0.11	0.090	666.6	-	32.03	650
59	354	0.0050	0.008	0.322	-	-	0.163	0.007	0.000	0.11	0.092	699.8	-	32.84	683
60	360	0.0060	0.010	0.331	-	-	0.171	0.008	0.000	0.13	0.096	734.2	-	33.82	717
61	366	0.0060	0.010	0.341	-	-	0.179	0.008	0.000	0.13	0.100	770.1	-	35.17	752
62	372	0.0060	0.010	0.350	-	-	0.187	0.008	0.000	0.13	0.104	807.5	-	36.64	789
63	378	0.0060	0.010	0.360	-	-	0.195	0.008	0.000	0.14	0.107	846.1	-	37.98	827
64	384	0.0070	0.011	0.371	-	-	0.204	0.010	0.000	0.16	0.112	886.4	-	39.45	866
65	390	0.0060	0.010	0.381	-	-	0.212	0.008	0.000	0.14	0.116	928.1	-	41.01	907
66	396	0.0060	0.010	0.390	-	-	0.221	0.008	0.000	0.14	0.118	970.8	-	42.20	949
67	402	0.0060	0.010	0.400	-	-	0.229	0.008	0.000	0.14	0.121	1,014.2	-	43.06	993
68	408	0.0060	0.010	0.410	-	-	0.237	0.008	0.000	0.14	0.123	1,058.5	-	43.84	1,036
69	414	0.0060	0.010	0.419	-	-	0.246	0.008	0.000	0.14	0.125	1,103.4	-	44.57	1,081
70	420	0.0070	0.011	0.430	-	-	0.256	0.010	0.000	0.16	0.128	1,149.4	-	45.48	1,126
71	426	0.0070	0.011	0.442	-	-	0.266	0.010	0.000	0.17	0.132	1,197.0	-	46.81	1,173
72	432	0.0080	0.013	0.454	-	-	0.277	0.011	0.000	0.19	0.137	1,246.4	-	48.50	1,222
73	438	0.0080	0.013	0.467	-	-	0.288	0.011	0.000	0.19	0.143	1,298.0	-	50.52	1,272
74	444	0.0090	0.014	0.482	-	-	0.301	0.013	0.000	0.22	0.150	1,352.1	-	52.84	1,325
75	450	0.0100	0.016	0.498	-	-	0.316	0.014	0.000	0.24	0.159	1,409.4	-	55.68	1,381
76	456	0.0210	0.034	0.531	-	-	0.346	0.031	0.001	0.51	0.184	1,475.6	-	61.75	1,443
77	462	0.0240	0.038	0.570	-	-	0.382	0.035	0.001	0.59	0.226	1,556.9	-	73.74	1,516
78	468	0.0240	0.038	0.608	-	-	0.417	0.036	0.001	0.59	0.268	1,653.2	-	88.81	1,605
79	474	0.0240	0.038	0.646	-	-	0.453	0.036	0.001	0.60	0.305	1,763.1	-	103.11	1,708
80	480	0.0220	0.035	0.682	-	-	0.486	0.033	0.001	0.55	0.336	1,884.1	-	115.44	1,824
81	486	0.0140	0.022	0.704	0.000	0.000	0.507	0.021	0.001	0.38	0.351	2,010.5	-	123.71	1,947
82	492	0.0130	0.021	0.725	0.000	0.000	0.527	0.020	0.001	0.51	0.362	2,140.9	-	128.38	2,076
83	498	0.0100	0.016	0.741	0.001	0.000	0.542	0.015	0.001	0.50	0.378	2,277.1	-	133.28	2,209
84	504	0.0100	0.016	0.757	0.001	0.001	0.557	0.015	0.001	0.59	0.398	2,420.2	-	139.68	2,349
85	510	0.0080	0.013	0.770	0.002	0.001	0.569	0.012	0.001	0.54	0.417	2,570.3	-	146.62	2,495
86	516	0.0090	0.014	0.784	0.002	0.001	0.583	0.014	0.001	0.68	0.439	2,728.3	-	154.05	2,649
87	522	0.0090	0.014	0.798	0.003	0.001	0.597	0.014	0.001	0.75	0.470	2,897.6	-	163.66	2,813
88	528	0.0070	0.011	0.810	0.004	0.001	0.608	0.011	0.001	0.63	0.496	3,076.1	-	173.86	2,987
89	534	0.0080	0.013	0.822	0.005	0.001	0.620	0.012	0.001	0.77	0.519	3,263.0	-	182.69	3,170
90	540	0.0070	0.011	0.834	0.006	0.001	0.630	0.011	0.001	0.72	0.546	3,459.5	-	191.72	3,361
91	546	0.0070	0.011	0.845	0.007	0.001	0.641	0.011	0.001	0.76	0.568	3,664.2	-	200.56	3,562
92	552	0.0060	0.010	0.854	0.007	0.001	0.650	0.009	0.001	0.69	0.587	3,875.4	-	207.93	3,770
93	558	0.0060	0.010	0.864	0.008	0.001	0.660	0.009	0.001	0.72	0.600	4,091.4	-	213.63	3,983

Area 2 - Proposed

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
					Pervious Area		Impervious Area								
Time Increment t	Elapsed Time	Rainfall Distr.	Incremental Rainfall P(t)	Accumulated Rainfall P	Accumulated Runoff	Incremental Runoff D_{perv} (t)	Accumulated Runoff	Incremental Runoff D_{imp}(t)	Total Runoff D(t)	Instant Flow Rate I(t)	Design Flow Rate Q(t)	Accumulated Runoff	Infiltration Rate O(t)	Change in Storage	Storage
	(minutes)	(fraction)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(cfs)	(cfs)	(cf)	(cfs)	(cf)	(cf)
94	564	0.0060	0.010	0.874	0.009	0.001	0.669	0.009	0.001	0.75	0.616	4,313.0	-	218.82	4,202
95	570	0.0050	0.008	0.882	0.010	0.001	0.677	0.008	0.001	0.65	0.625	4,538.0	-	223.30	4,426
96	576	0.0060	0.010	0.891	0.011	0.001	0.686	0.009	0.001	0.80	0.637	4,767.2	-	227.08	4,653
97	582	0.0050	0.008	0.899	0.012	0.001	0.694	0.008	0.001	0.69	0.649	5,000.9	-	231.45	4,884
98	588	0.0060	0.010	0.909	0.013	0.001	0.703	0.009	0.001	0.86	0.664	5,239.9	-	236.35	5,120
99	594	0.0050	0.008	0.917	0.014	0.001	0.710	0.008	0.001	0.74	0.679	5,484.3	-	241.69	5,362
100	600	0.0050	0.008	0.925	0.015	0.001	0.718	0.008	0.001	0.76	0.687	5,731.5	-	245.84	5,608
101	606	0.0050	0.008	0.933	0.016	0.001	0.726	0.008	0.001	0.78	0.696	5,982.1	-	248.89	5,857
102	612	0.0050	0.008	0.941	0.017	0.001	0.734	0.008	0.001	0.80	0.706	6,236.3	-	252.40	6,109
103	618	0.0050	0.008	0.949	0.018	0.001	0.741	0.008	0.001	0.82	0.718	6,494.7	-	256.32	6,366
104	624	0.0040	0.006	0.955	0.019	0.001	0.748	0.006	0.001	0.67	0.720	6,754.1	-	258.87	6,624
105	630	0.0050	0.008	0.963	0.020	0.001	0.755	0.008	0.001	0.85	0.725	7,015.0	-	260.14	6,885
106	636	0.0050	0.008	0.971	0.021	0.001	0.763	0.008	0.001	0.87	0.740	7,281.5	-	263.73	7,148
107	642	0.0040	0.006	0.978	0.022	0.001	0.769	0.006	0.001	0.71	0.746	7,550.1	-	267.55	7,416
108	648	0.0050	0.008	0.986	0.023	0.001	0.777	0.008	0.001	0.90	0.753	7,821.2	-	269.83	7,686
109	654	0.0050	0.008	0.994	0.024	0.001	0.785	0.008	0.001	0.92	0.771	8,098.9	-	274.40	7,960
110	660	0.0040	0.006	1.000	0.025	0.001	0.791	0.006	0.001	0.75	0.779	8,379.4	-	279.09	8,239
111	666	0.0040	0.006	1.006	0.026	0.001	0.797	0.006	0.001	0.76	0.777	8,658.9	-	280.02	8,519
112	672	0.0050	0.008	1.014	0.028	0.001	0.805	0.008	0.001	0.97	0.787	8,942.3	-	281.47	8,801
113	678	0.0040	0.006	1.021	0.029	0.001	0.811	0.006	0.001	0.79	0.798	9,229.5	-	285.29	9,086
114	684	0.0040	0.006	1.027	0.030	0.001	0.817	0.006	0.001	0.80	0.798	9,516.7	-	287.21	9,373
115	690	0.0040	0.006	1.034	0.031	0.001	0.824	0.006	0.001	0.81	0.799	9,804.3	-	287.39	9,661
116	696	0.0040	0.006	1.040	0.032	0.001	0.830	0.006	0.001	0.83	0.801	10,092.8	-	288.04	9,949
117	702	0.0040	0.006	1.046	0.033	0.001	0.836	0.006	0.001	0.84	0.805	10,382.5	-	289.10	10,238
118	708	0.0040	0.006	1.053	0.034	0.001	0.842	0.006	0.001	0.85	0.809	10,673.8	-	290.51	10,528
119	714	0.0030	0.005	1.058	0.035	0.001	0.847	0.005	0.001	0.64	0.802	10,962.5	-	290.00	10,818
120	720	0.0040	0.006	1.064	0.036	0.001	0.853	0.006	0.001	0.87	0.797	11,249.3	-	287.76	11,106
121	726	0.0040	0.006	1.070	0.038	0.001	0.859	0.006	0.001	0.88	0.806	11,539.4	-	288.43	11,394
122	732	0.0030	0.005	1.075	0.038	0.001	0.864	0.005	0.001	0.67	0.802	11,828.1	-	289.38	11,684
123	738	0.0040	0.006	1.082	0.040	0.001	0.870	0.006	0.001	0.90	0.800	12,116.0	-	288.34	11,972
124	744	0.0040	0.006	1.088	0.041	0.001	0.876	0.006	0.001	0.91	0.812	12,408.4	-	290.14	12,262
125	750	0.0040	0.006	1.094	0.042	0.001	0.883	0.006	0.001	0.92	0.824	12,705.0	-	294.49	12,557
126	756	0.0040	0.006	1.101	0.043	0.001	0.889	0.006	0.001	0.93	0.836	13,005.9	-	298.79	12,855
127	762	0.0030	0.005	1.106	0.044	0.001	0.894	0.005	0.001	0.71	0.834	13,306.2	-	300.61	13,156
128	768	0.0040	0.006	1.112	0.046	0.001	0.900	0.006	0.001	0.95	0.834	13,606.3	-	300.20	13,456
129	774	0.0030	0.005	1.117	0.047	0.001	0.904	0.005	0.001	0.72	0.834	13,906.6	-	300.18	13,756
130	780	0.0040	0.006	1.123	0.048	0.001	0.911	0.006	0.001	0.97	0.835	14,207.4	-	300.51	14,057
131	786	0.0040	0.006	1.130	0.049	0.001	0.917	0.006	0.001	0.98	0.852	14,514.0	-	303.70	14,361
132	792	0.0030	0.005	1.134	0.050	0.001	0.922	0.005	0.001	0.74	0.853	14,821.1	-	306.86	14,668
133	798	0.0040	0.006	1.141	0.052	0.001	0.928	0.006	0.002	1.00	0.855	15,129.0	-	307.51	14,975
134	804	0.0040	0.006	1.147	0.053	0.001	0.934	0.006	0.002	1.01	0.873	15,443.2	-	311.04	15,286
135	810	0.0030	0.005	1.152	0.054	0.001	0.939	0.005	0.001	0.77	0.875	15,758.0	-	314.51	15,601
136	816	0.0030	0.005	1.157	0.055	0.001	0.943	0.005	0.001	0.77	0.862	16,068.5	-	312.66	15,913
137	822	0.0040	0.006	1.163	0.057	0.001	0.950	0.006	0.002	1.04	0.867	16,380.8	-	311.37	16,225
138	828	0.0030	0.005	1.168	0.058	0.001	0.954	0.005	0.001	0.79	0.873	16,694.9	-	313.18	16,538
139	834	0.0040	0.006	1.174	0.059	0.001	0.961	0.006	0.002	1.06	0.878	17,011.0	-	315.11	16,853
140	840	0.0030	0.005	1.179	0.060	0.001	0.965	0.005	0.001	0.80	0.884	17,329.2	-	317.16	17,170
141	846	0.0030	0.005	1.184	0.062	0.001	0.970	0.005	0.001	0.81	0.875	17,644.0	-	316.51	17,487
142	852	0.0040	0.006	1.190	0.063	0.002	0.976	0.006	0.002	1.08	0.883	17,961.7	-	316.27	17,803
143	858	0.0030	0.005	1.195	0.064	0.001	0.981	0.005	0.001	0.82	0.890	18,282.3	-	319.12	18,122
144	864	0.0030	0.005	1.200	0.065	0.001	0.986	0.005	0.001	0.82	0.882	18,600.0	-	319.12	18,441
145	870	0.0040	0.006	1.206	0.067	0.002	0.992	0.006	0.002	1.11	0.892	18,921.1	-	319.44	18,761
146	876	0.0030	0.005	1.211	0.068	0.001	0.997	0.005	0.001	0.84	0.901	19,245.7	-	322.85	19,083
147	882	0.0030	0.005	1.216	0.069	0.001	1.001	0.005	0.001	0.84	0.895	19,567.7	-	323.28	19,407
148	888	0.0040	0.006	1.222	0.071	0.002	1.008	0.006	0.002	1.13	0.905	19,893.6	-	323.98	19,731
149	894	0.0030	0.005	1.227	0.072	0.001	1.012	0.005	0.001	0.86	0.916	20,223.3	-	327.79	20,058
150	900	0.0030	0.005	1.232	0.073	0.001	1.017	0.005	0.001	0.86	0.909	20,550.6	-	328.50	20,387
151	906	0.0030	0.005	1.237	0.074	0.001	1.022	0.005	0.001	0.87	0.904	20,876.1	-	326.44	20,713
152	912	0.0040	0.006	1.243	0.076	0.002	1.028	0.006	0.002	1.17	0.917	21,206.3	-	327.87	21,041
153	918	0.0030	0.005	1.248	0.077	0.001	1.033	0.005	0.001	0.88	0.929	21,541.0	-	332.41	21,374
154	924	0.0030	0.005	1.253	0.079	0.001	1.037	0.005	0.001	0.89	0.924	21,873.7	-	333.67	21,707
155	930	0.0030	0.005	1.258	0.080	0.001	1.042	0.005	0.001	0.89	0.920	22,205.0	-	332.01	22,039
156	936	0.0030	0.005	1.262	0.081	0.001	1.047	0.005	0.001	0.90	0.917	22,535.2	-	330.78	22,370
157	942	0.0040	0.006	1.269	0.083	0.002	1.053	0.006	0.002	1.21	0.933	22,871.1	-	333.03	22,703
158	948	0.0030	0.005	1.274	0.084	0.001	1.058	0.005	0.001	0.91	0.947	23,212.0	-	338.40	23,042
159	954	0.0030	0.005	1.278	0.085	0.001	1.062	0.005	0.001	0.92	0.943	23,551.6	-	340.29	23,382
160	960	0.0030	0.005	1.283	0.087	0.001	1.067	0.005	0.001	0.92	0.940	23,890.2	-	339.08	23,721
161	966	0.0030	0.005	1.288	0.088	0.001	1.072	0.005	0.001	0.93	0.939	24,228.1	-	338.24	24,059
162	972	0.0030	0.005	1.293	0.089	0.001	1.077	0.005	0.001	0.93	0.938	24,565.6	-	337.72	24,397
163	978	0.0030	0.005	1.298	0.091	0.001	1.081	0.005	0.001	0.94	0.937	24,903.1	-	337.47	24,734
164	984	0.0030	0.005	1.302	0.092	0.001	1.086	0.005	0.001	0.94	0.938	25,240.6	-	337.48	25,072
165	990	0.0030	0.005	1.307	0.093	0.001	1.091	0.005	0.001	0.95	0.939	25,578.5	-	337.71	25,410
166	996	0.0030	0.005	1.312	0.095	0.001	1.095	0.005	0.001	0.95	0.940	25,916.9	-	338.13	25,748
167	1002	0.0030	0.005	1.317	0.096	0.001	1.100	0.005	0.001	0.96	0.942	26,255.9	-	338.72	26,086
168	1008	0.0030	0.005	1.322	0.097	0.001	1.105	0.005	0.001	0.96	0.944	26,595.8	-	339.47	26,426
169	1014	0.0030	0.005	1.326	0.099	0.001	1.109	0.005	0.001	0.97	0.947	26,936.6	-	340.34	26,766
170	1020	0.0030	0.005	1.331	0.100	0.001	1.114	0.005	0.001	0.97	0.950	27,278.5	-	341.33	27,108
171	1026	0.0030	0.005	1.336	0.101	0.001	1.119	0.005	0.001	0.98	0.953	27,621.5	-	342.43	27,450

Area 2 - Proposed

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
					Pervious Area		Impervious Area								
Time Increment t	Elapsed Time	Rainfall Distr.	Incremental Rainfall P(t)	Accumulated Rainfall P	Accumulated Runoff	Incremental Runoff D_{perv} (t)	Accumulated Runoff	Incremental Runoff D_{imp}(t)	Total Runoff D(t)	Instant Flow Rate I(t)	Design Flow Rate Q(t)	Accumulated Runoff	Infiltration Rate O(t)	Change in Storage	Storage
	(minutes)	(fraction)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(cfs)	(cfs)	(cf)	(cfs)	(cf)	(cf)
172	1032	0.0030	0.005	1.341	0.103	0.001	1.124	0.005	0.001	0.99	0.956	27,965.7	-	343.61	27,794
173	1038	0.0030	0.005	1.346	0.104	0.001	1.128	0.005	0.001	0.99	0.960	28,311.2	-	344.88	28,138
174	1044	0.0030	0.005	1.350	0.106	0.001	1.133	0.005	0.001	1.00	0.964	28,658.1	-	346.21	28,485
175	1050	0.0030	0.005	1.355	0.107	0.001	1.138	0.005	0.002	1.00	0.968	29,006.4	-	347.60	28,832
176	1056	0.0030	0.005	1.360	0.109	0.001	1.142	0.005	0.002	1.01	0.972	29,356.2	-	349.05	29,181
177	1062	0.0020	0.003	1.363	0.109	0.001	1.146	0.003	0.001	0.67	0.956	29,700.5	-	347.05	29,528
178	1068	0.0030	0.005	1.368	0.111	0.001	1.150	0.005	0.002	1.01	0.943	30,040.2	-	341.99	29,870
179	1074	0.0030	0.005	1.373	0.112	0.001	1.155	0.005	0.002	1.02	0.952	30,382.9	-	341.17	30,212
180	1080	0.0030	0.005	1.378	0.114	0.001	1.160	0.005	0.002	1.02	0.960	30,728.4	-	344.13	30,556
181	1086	0.0030	0.005	1.382	0.115	0.001	1.164	0.005	0.002	1.03	0.968	31,076.8	-	346.95	30,903
182	1092	0.0020	0.003	1.386	0.116	0.001	1.168	0.003	0.001	0.69	0.955	31,420.6	-	346.09	31,249
183	1098	0.0030	0.005	1.390	0.118	0.001	1.172	0.005	0.002	1.04	0.945	31,760.7	-	341.95	31,591
184	1104	0.0030	0.005	1.395	0.119	0.001	1.177	0.005	0.002	1.04	0.956	32,104.7	-	342.03	31,933
185	1110	0.0030	0.005	1.400	0.121	0.001	1.182	0.005	0.002	1.05	0.966	32,452.4	-	345.86	32,279
186	1116	0.0020	0.003	1.403	0.122	0.001	1.185	0.003	0.001	0.70	0.955	32,796.3	-	345.82	32,624
187	1122	0.0030	0.005	1.408	0.123	0.002	1.190	0.005	0.002	1.06	0.947	33,137.1	-	342.34	32,967
188	1128	0.0030	0.005	1.413	0.125	0.002	1.194	0.005	0.002	1.06	0.959	33,482.4	-	343.06	33,310
189	1134	0.0020	0.003	1.416	0.126	0.001	1.197	0.003	0.001	0.71	0.951	33,824.8	-	343.84	33,654
190	1140	0.0030	0.005	1.421	0.127	0.002	1.202	0.005	0.002	1.07	0.944	34,164.5	-	341.05	33,995
191	1146	0.0030	0.005	1.426	0.129	0.002	1.207	0.005	0.002	1.07	0.958	34,509.6	-	342.41	34,337
192	1152	0.0020	0.003	1.429	0.130	0.001	1.210	0.003	0.001	0.72	0.951	34,852.1	-	343.77	34,681
193	1158	0.0030	0.005	1.434	0.131	0.002	1.215	0.005	0.002	1.08	0.945	35,192.4	-	341.43	35,022
194	1164	0.0020	0.003	1.437	0.132	0.001	1.218	0.003	0.001	0.72	0.941	35,531.0	-	339.49	35,362
195	1170	0.0030	0.005	1.442	0.134	0.002	1.223	0.005	0.002	1.09	0.937	35,868.3	-	337.92	35,700
196	1176	0.0030	0.005	1.446	0.136	0.002	1.227	0.005	0.002	1.09	0.955	36,211.9	-	340.44	36,040
197	1182	0.0020	0.003	1.450	0.137	0.001	1.231	0.003	0.001	0.73	0.950	36,553.9	-	342.82	36,383
198	1188	0.0030	0.005	1.454	0.138	0.002	1.235	0.005	0.002	1.10	0.946	36,894.5	-	341.31	36,724
199	1194	0.0020	0.003	1.458	0.139	0.001	1.238	0.003	0.001	0.74	0.943	37,234.1	-	340.11	37,064
200	1200	0.0030	0.005	1.462	0.141	0.002	1.243	0.005	0.002	1.11	0.941	37,572.9	-	339.18	37,404
201	1206	0.0020	0.003	1.466	0.142	0.001	1.246	0.003	0.001	0.74	0.939	37,911.1	-	338.50	37,742
202	1212	0.0030	0.005	1.470	0.143	0.002	1.251	0.005	0.002	1.12	0.938	38,249.0	-	338.03	38,080
203	1218	0.0020	0.003	1.474	0.145	0.001	1.254	0.003	0.001	0.75	0.938	38,586.6	-	337.75	38,418
204	1224	0.0020	0.003	1.477	0.146	0.001	1.257	0.003	0.001	0.75	0.916	38,916.5	-	333.75	38,752
205	1230	0.0030	0.005	1.482	0.147	0.002	1.262	0.005	0.002	1.13	0.919	39,247.3	-	330.35	39,082
206	1236	0.0020	0.003	1.485	0.148	0.001	1.265	0.003	0.001	0.76	0.922	39,579.1	-	331.33	39,413
207	1242	0.0030	0.005	1.490	0.150	0.002	1.270	0.005	0.002	1.14	0.925	39,912.0	-	332.33	39,746
208	1248	0.0020	0.003	1.493	0.151	0.001	1.273	0.003	0.001	0.76	0.927	40,245.8	-	333.35	40,079
209	1254	0.0020	0.003	1.496	0.152	0.001	1.276	0.003	0.001	0.76	0.908	40,572.8	-	330.44	40,409
210	1260	0.0030	0.005	1.501	0.154	0.002	1.281	0.005	0.002	1.15	0.914	40,901.8	-	328.00	40,737
211	1266	0.0020	0.003	1.504	0.155	0.001	1.284	0.003	0.001	0.77	0.919	41,232.6	-	329.89	41,067
212	1272	0.0020	0.003	1.507	0.156	0.001	1.287	0.003	0.001	0.77	0.902	41,557.2	-	327.71	41,395
213	1278	0.0030	0.005	1.512	0.158	0.002	1.292	0.005	0.002	1.16	0.909	41,884.4	-	325.91	41,721
214	1284	0.0020	0.003	1.515	0.159	0.001	1.295	0.003	0.001	0.78	0.916	42,214.1	-	328.41	42,049
215	1290	0.0020	0.003	1.518	0.160	0.001	1.298	0.003	0.001	0.78	0.900	42,537.9	-	326.73	42,376
216	1296	0.0030	0.005	1.523	0.162	0.002	1.303	0.005	0.002	1.17	0.908	42,864.8	-	325.38	42,701
217	1302	0.0020	0.003	1.526	0.163	0.001	1.306	0.003	0.001	0.78	0.916	43,194.5	-	328.31	43,030
218	1308	0.0020	0.003	1.530	0.164	0.001	1.309	0.003	0.001	0.78	0.901	43,518.8	-	326.97	43,357
219	1314	0.0020	0.003	1.533	0.165	0.001	1.312	0.003	0.001	0.79	0.887	43,838.2	-	321.85	43,679
220	1320	0.0020	0.003	1.536	0.166	0.001	1.316	0.003	0.001	0.79	0.876	44,153.6	-	317.40	43,996
221	1326	0.0021	0.003	1.539	0.167	0.001	1.319	0.003	0.001	0.83	0.868	44,466.1	-	313.95	44,310
222	1332	0.0020	0.003	1.543	0.168	0.001	1.322	0.003	0.001	0.79	0.862	44,776.3	-	311.39	44,621
223	1338	0.0020	0.003	1.546	0.170	0.001	1.325	0.003	0.001	0.79	0.854	45,083.7	-	308.80	44,930
224	1344	0.0020	0.003	1.549	0.171	0.001	1.328	0.003	0.001	0.80	0.847	45,388.7	-	306.18	45,236
225	1350	0.0020	0.003	1.552	0.172	0.001	1.332	0.003	0.001	0.80	0.841	45,691.6	-	303.94	45,540
226	1356	0.0020	0.003	1.555	0.173	0.001	1.335	0.003	0.001	0.80	0.837	45,992.8	-	302.04	45,842
227	1362	0.0020	0.003	1.559	0.174	0.001	1.338	0.003	0.001	0.80	0.833	46,292.5	-	300.44	46,143
228	1368	0.0020	0.003	1.562	0.175	0.001	1.341	0.003	0.001	0.80	0.829	46,591.0	-	299.11	46,442
229	1374	0.0020	0.003	1.565	0.176	0.001	1.344	0.003	0.001	0.81	0.826	46,888.5	-	298.01	46,740
230	1380	0.0020	0.003	1.568	0.178	0.001	1.347	0.003	0.001	0.81	0.824	47,185.2	-	297.12	47,037
231	1386	0.0020	0.003	1.571	0.179	0.001	1.350	0.003	0.001	0.81	0.823	47,481.3	-	296.42	47,333
232	1392	0.0020	0.003	1.575	0.180	0.001	1.354	0.003	0.001	0.81	0.821	47,777.0	-	295.87	47,629
233	1398	0.0020	0.003	1.578	0.181	0.001	1.357	0.003	0.001	0.81	0.820	48,072.3	-	295.47	47,925
234	1404	0.0020	0.003	1.581	0.182	0.001	1.360	0.003	0.001	0.82	0.820	48,367.4	-	295.19	48,220
235	1410	0.0020	0.003	1.584	0.183	0.001	1.363	0.003	0.001	0.82	0.819	48,662.3	-	295.03	48,515
236	1416	0.0020	0.003	1.587	0.185	0.001	1.366	0.003	0.001	0.82	0.819	48,957.3	-	294.96	48,810
237	1422	0.0020	0.003	1.591	0.186	0.001	1.369	0.003	0.001	0.82	0.819	49,252.3	-	294.99	49,105
238	1428	0.0020	0.003	1.594	0.187	0.001	1.373	0.003	0.001	0.82	0.820	49,547.5	-	295.09	49,400
239	1434	0.0020	0.003	1.597	0.188	0.001	1.376	0.003	0.001	0.83	0.820	49,842.8	-	295.26	49,695
240	1440	0.0020	0.003	1.600	0.189	0.001	1.379	0.003	0.001	0.83	0.821	50,138.4	-	295.48	49,991

PCM 1.10

PUBLIC HEALTH
Prevent • Promote • Protect
BENTON-FRANKLIN HEALTH DISTRICT

RECEIVED
MAY 7 2021
Benton Co. Planning Dept.

April 28, 2021

R3T Ventures LLC
2410 N 4th Ave
Pasco, WA 99331

RE: Revised Preliminary Review of Mammoth Acres Parcel # 1-2388-100-0003-000, Benton County.

Dear Mr. Duncan:

This department completed a preliminary plat review on March 24th 2021 of the above referenced plat proposal. On April 28th 2021 a revision was made to increase the subdivision from 11 to 12 lots. This department has reviewed the above referenced plat in accordance with our current land development policies and requirements for new subdivisions. Our findings are listed below:

1. There 12 lots ranging from 5.00 acre to 6.97 acres.
2. The proposed land use is for single family dwellings.
3. Soils encountered throughout the proposed plat area are Type 5 (silt loam).
4. Slopes are variable throughout the plat.
5. Proposed domestic water supply is single family wells.

Findings indicate the above referenced plat generally meets our requirements for plats utilizing onsite sewage disposal systems and an on-site single family water supply, provided:

1. All lots shall have a minimum of 1 acre in size and contain a minimum of 20,000 square feet of usable land area.
2. All wells, irrigation lines, canals, and surface waters within 150ft of the plat are shown on the plat map.
3. Prior to final approval, this office must be given the opportunity to review the final plat for compliance with Benton-Franklin Health Department Rules and Regulations No. 2, and WAC 246-272A, and issue appropriate comments to the Benton County Planning Department.

7102 W. Okanogan Place
Kennewick, WA 99336
Office: (509) 460-4200

412 W. Clark
Pasco, WA 99301
Office: (509) 547-9737

4. Prior to the issuance of any onsite sewage disposal permits, additional test holes may be required to verify acceptable area for initial and replacement sewage disposal system and design criteria such as trench depth on each lot.

5. It is recommended that some provision be made to facilitate future connection to a municipal sewer utility at such time as said utility becomes available.

6. The following statement is placed on the plat:
   "This plat appears to have suitable conditions for the use of on-site sewage disposal systems. However, because of the nature of the testing methods used, we have no way of determining whether each lot can comply with Benton-Franklin Board of Health Rules and Regulation at the time of permit issuance. Further be advised this department's approval of any lot within this plat for the use of on-site sewage disposal systems may be contingent upon that lot passing additional soil inspections, percolation tests, and/or other requirements at a later date."

This recommendation is based on present known site conditions and does not guarantee the granting of an on-site sewage disposal permit. Our approval of any lot within this plat may be contingent upon that lot passing additional soil inspections/percolation tests, and/or other requirements at a later date. Should adverse site conditions be revealed at a later date, the Health Department reserves the right to impose restrictions or deny the issuance of any on-site sewage disposal permit.

Your application will be held in an active state until February 10th 2022, at which time the submittal will be deemed null and void should this proposal not be developed by that time.

If you have any questions, please contact me at the Health Department at (509) 460-4330.

Sincerely,

JW Gr

Justin Gerber
Environmental Health Specialist II

CC: Benton County Planning Department

Donna Hutchinson

From: Fernando Garcia <Fernando.Garcia@ci.kennewick.wa.us>
Sent: Thursday, May 20, 2021 4:52 PM
To: Donna Hutchinson
Cc: Sorin Juster; Joe Seet; Martin Nelson
Subject: [EXTERNAL] FW: Agency Review of t5he Preliminary plat of Mammoth Acres SUB 2021-004
Attachments: SUB 2021-004 Agency Review PKT 5-20-21.pdf

EXTERNAL EMAIL WARNING!!!: This email originated from outside of Benton County. DO NOT click links or open attachments unless you recognize the sender and know the content is safe.

Ms. Hutchinson,

City of Kennewick (COK) Public Works Department does not have any comments on this project located outside the COK UGA.

Thank you,

Fernando Garcia
City of Kennewick
Public Works
Development Services Supervisor
O: 509.585.4481 F: 509.585.4451
Fernando.Garcia@ci.kennewick.wa.us

Disclaimer: Public documents and records are available to the public as required under the Washington State Public Records Act (RCW 42.56). The information contained in all correspondence with a public entity may be disclosable to third party requesters under the Public Records Act

From: Planning Department <Planning.Department@co.benton.wa.us>
Sent: Thursday, May 20, 2021 4:41 PM
To: Fire District #1-Billie <billie@bentonone.org>; Fire District #1-Staff <staff@bentonone.org>; School District # 17-Ryan Jones <Ryan.Jones@ksd.org>; Fernando Garcia <Fernando.Garcia@ci.kennewick.wa.us>; john.lyle@bentoncleanair.org; Benton Clean Air-Priddy <robin.priddy@bentoncleanair.org>; Benton Clean Air-Rodger <rob.rodger@bentoncleanair.org>; Benton Clean Air-Tyler Thompson <tyler.thompson@bentoncleanair.org>; Benton-Franklin Dist. Health Dept. <rickd@bfhd.wa.gov>; Frontier Telephone <north.central.dbmc.control.desk@ncnetwork.net>; Dept. of Transportation (scplanning@wsdot.wa.gov) <scplanning@wsdot.wa.gov>; Cascade Natural Gas (Walter.Nelson@cngc.com) <Walter.Nelson@cngc.com>; Natural Resources Conservation Service <ray.gekosky@wa.usda.gov>; US Postal Service - Address Management System <Tina.C.Fisher@usps.gov>; WA Dept of Health - Kelly Cooper - WA Dept of Health - Kelly Cooper (SEPA.reviewteam@doh.wa.gov) <SEPA.reviewteam@doh.wa.gov>; Cristina Woods <Cristina.Woods@co.benton.wa.us>; Ben Franklin Transit - Bill Barlow (bbarlow@bft.org) <bbarlow@bft.org>; Ben Franklin Transit K. McMullen <KmcMullen@bft.org>; Ben Franklin Transit - B. Windler <bwindler@bft.org>; Dept. of Ecology - Lori White (lori.white@ecy.wa.gov) <lori.white@ecy.wa.gov>; Dept. of Ecology-Former Orchards SEPA (FormerOrchards@ecy.wa.gov) <FormerOrchards@ecy.wa.gov>; Southeast Communication Center (k.lettrick@bces.wa.gov) <k.lettrick@bces.wa.gov>; Clark Posey <Clark.Posey@co.benton.wa.us>; PARKS <PARKS@co.benton.wa.us>; Mike Wilson <Mike.Wilson@co.benton.wa.us>; Mosquito Control (admin@mosquitocontrol.org) <admin@mosquitocontrol.org>; Benton PUD-Chad Brooks <Brooksc@bentonpud.org>; Benton PUD-Mike Irving <irvingm@bentonpud.org>; Benton PUD-Shanna Everson <eversons@bentonpud.org>; Benton

PUD-tina Glines (glinest@bentonpud.org) <glinest@bentonpud.org>
Subject: Agency Review of t5he Preliminary plat of Mammoth Acres SUB 2021-004

Please see the attached for agency review of the preliminary plat of Mammoth Acres - SUB 2021-004. If you have any comments please contact our office.

Donna Hutchinson
Office Assistant IV
Community Development Dept.
Planning Division
PO Box 910 Prosser WA 99350
(509) 786-5612

NOTICE OF PUBLIC DISCLOSURE: This e-mail account is public domain. Any correspondence from or to this email account may be a public record. Accordingly, this email, in whole or in part, may be subject to disclosure pursuant to RCW 42.56, regardless of any claim of confidentiality or privilege asserted by an external party.

Prosser: We are now located within the Road Department/Public Works Office on the first floor of the Benton County Courthouse at 620 Market St, Prosser WA 99350. **Kennewick:** The County has opened a new Public Services Office at 102206 E Wiser Parkway, Kennewick, which houses the Planning, Building and Road Departments.

Donna Hutchinson

From: Clark Posey
Sent: Friday, May 21, 2021 8:40 AM
To: Planning Department
Subject: RE: Agency Review of t5he Preliminary plat of Mammoth Acres SUB 2021-004

Fire Marshal Comments for:

SUB 2021-004 Mammoth Acres Subdivision Parcel # 1-2388-100-0003-000

Ron Duncan
632 W Sylvester St
Pasco, WA 99301

As the road will be a county road and will be constructed to county specifications the only comments I have is if driveways are 200' (feet) or more,
the applicant or new lot owners must comply with BCC 3.18.045 for Driveways and Private Roads.

Thank you,

Clark

From: Planning Department <Planning.Department@co.benton.wa.us>
Sent: Thursday, May 20, 2021 4:41 PM
To: Fire District #1-Billie <billie@bentonone.org>; Fire District #1-Staff <staff@bentonone.org>; School District # 17-Ryan Jones <Ryan.Jones@ksd.org>; City of Kennewick - Fernando Garcia <Fernando.Garcia@ci.kennewick.wa.us>; john.lyle@bentoncleanair.org; Benton Clean Air-Priddy <robin.priddy@bentoncleanair.org>; Benton Clean Air-Rodger <rob.rodger@bentoncleanair.org>; Benton Clean Air-Tyler Thompson <tyler.thompson@bentoncleanair.org>; Benton-Franklin Dist. Health Dept. <rickd@bfhd.wa.gov>; Frontier Telephone <north.central.dbmc.control.desk@ncnetwork.net>; Dept. of Transportation (scplanning@wsdot.wa.gov) <scplanning@wsdot.wa.gov>; Cascade Natural Gas (Walter.Nelson@cngc.com) <Walter.Nelson@cngc.com>; Natural Resources Conservation Service <ray.gekosky@wa.usda.gov>; US Postal Service - Address Management System <Tina.C.Fisher@usps.gov>; WA Dept of Health - Kelly Cooper - WA Dept of Health - Kelly Cooper (SEPA.reviewteam@doh.wa.gov) <SEPA.reviewteam@doh.wa.gov>; Cristina Woods <Cristina.Woods@co.benton.wa.us>; Ben Franklin Transit - Bill Barlow (bbarlow@bft.org) <bbarlow@bft.org>; Ben Franklin Transit K. McMullen <KmcMullen@bft.org>; Ben Franklin Transit - B. Windler <bwindler@bft.org>; Dept. of Ecology - Lori White (lori.white@ecy.wa.gov) <lori.white@ecy.wa.gov>; Dept. of Ecology-Former Orchards SEPA (FormerOrchards@ecy.wa.gov) <FormerOrchards@ecy.wa.gov>; Southeast Communication Center (k.lettrick@bces.wa.gov) <k.lettrick@bces.wa.gov>; Clark Posey <Clark.Posey@co.benton.wa.us>; PARKS

<PARKS@co.benton.wa.us>; Mike Wilson <Mike.Wilson@co.benton.wa.us>; Mosquito Control (admin@mosquitocontrol.org) <admin@mosquitocontrol.org>; Benton PUD-Chad Brooks <Brooksc@bentonpud.org>; Benton PUD-Mike Irving <irvingm@bentonpud.org>; Benton PUD-Shanna Everson <eversons@bentonpud.org>; Benton PUD-tina Glines (glinest@bentonpud.org) <glinest@bentonpud.org>
Subject: Agency Review of t5he Preliminary plat of Mammoth Acres SUB 2021-004

Please see the attached for agency review of the preliminary plat of Mammoth Acres - SUB 2021-004. If you have any comments please contact our office.

Donna Hutchinson
Office Assistant IV
Community Development Dept.
Planning Division
PO Box 910 Prosser WA 99350
(509) 786-5612

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Prosser: We are now located within the Road Department/Public Works Office on the first floor of the Benton County Courthouse at 620 Market St, Prosser WA 99350. **Kennewick:** The County has opened a new Public Services Office at 102206 E Wiser Parkway, Kennewick, which houses the Planning, Building and Road Departments.

PCM 1.13

Please check each one that you feel is appropriate for your agency.

If you have any comments or objections - please elaborate under item no. 9.

		Approval	Object
1.	Lot size of _____	_____	_____
2.	Access (Roads, alleys & other public ways)	_____	_____
3.	Water Supply	_____	_____
4.	Sanitary waste disposal systems	_____	_____
5.	Parks and Playgrounds	_____	_____
6.	Fire protection facilities	_____	_____
7.	Drainage and storm water easements	_____	_____
8.	Utility easements (Phone, water, gas, etc.)	_____	_____

9. A 10.00 foot utility easement needs to be provided along all roads, between each parcel and where the existing overhead power runs east to west in the access road.

BPUD will need to be informed of any need for three phase power for well pumps prior to power layout.

I certify that the above recommendations are adequate for this agency.

Signature Tina Glines

Agency Benton PUD

Date 5/26/2021

Project Name Mammoth Acres Preliminary Plat

File No. SUB 2021-004

Allyson Brooks Ph.D., Director
State Historic Preservation Officer

June 3, 2021

Greg Wendt
Principal Planner
Benton County
PO Box 910
Prosser, WA 99350

In future correspondence please refer to:
Project Tracking Code: 2021-06-03210
Property: Benton County_Mammoth Acres Subdivision (EA 2021-014)
Re: Survey Requested

Dear Greg Wendt:

Thank you for contacting the Washington State Historic Preservation Officer (SHPO) and Department of Archaeology and Historic Preservation (DAHP) and providing documentation regarding the above referenced project. Our statewide predictive model indicates that there is a moderate-to-low probability of encountering cultural resources within the proposed project area. However, very few cultural resource studies have been performed in this area, and archaeological sites have been found on many landforms in Benton County. Further, the scale of the proposed ground disturbing actions would destroy any archaeological resources present. Identification during construction is not a recommended detection method because inadvertent discoveries often result in costly construction delays and damage to the resource. Therefore, we recommend a professional archaeological survey of the project area be conducted prior to ground disturbing activities. We also recommend consultation with the concerned Tribes' cultural committees and staff regarding cultural resource issues.

These comments are based on the information available at the time of this review and on behalf of the SHPO in conformance with Washington State law. Should additional information become available, our assessment may be revised.

Thank you for the opportunity to comment on this project and we look forward to receiving the survey report. Please ensure that the DAHP Project Number (a.k.a. Project Tracking Code) is shared with any hired cultural resource consultants and is attached to any communications or submitted reports. Should you have any questions, please feel free to contact me.

Sincerely,

Sydney Hanson
Transportation Archaeologist
(360) 280-7563
Sydney.Hanson@dahp.wa.gov

BENTON COUNTY WA
PUBLIC WORKS DEPARTMENT

TO: PLANNING DEPARTMENT

FROM: DOUGLAS D'HONDT

CC: CRISTINA WOODS

DATE:6/7/2021

SUBJECT: PRELIMINARY PLAT – SUB 2021-004 MAMMOTH ACRES & EA 2021-014

Please add the following as conditions of final approval for the above reference plat:

1. During the review of the above subdivision Public Works discovered the existence of a parcel of unknown ownership, parcel numbered 123881008888888 where 297 PR SE runs through the length of that parcel and through 123881000003000, the parcel being subdivided. Local residents being served by 297 PR SE will be negatively impacted by the addition of 12 lots, as their gravel access will likely be used as a short cut. Additional traffic to that portion of 297 PR SE between Clodfelter Road and the proposed road for the development from the development is anticipated. This will impact those who pay to manage that portion of the road and will increase dust emissions. It will also require the road to serve more parcels than currently allowed by County code. Therefore, this portion of the road shall be constructed to county road standard and the underlying 60 feet of property shall be dedicated as county right-of-way the entire length.

2. The developer shall provide a complete set of engineered construction drawings for review and approval by the County and associated utilities. The drawings shall contain all appropriate information listed on the attached Minimum Plan Requirements. Grading plan will include grading to shape any drainage easements to route and fully contain all runoff based upon the 100-year storm within the easement limits. All plans and associated reports shall be prepared by a Professional Engineer licensed to practice in the State of Washington

3. All construction shall be in accordance with the most current WSDOT Standard Specifications for Road, Bridge and Municipal Construction, applicable Benton County Standard Plans and the requirements of the County Engineer

4. All roads within this plat shall have a paved width of 24 feet with a minimum 2-foot gravel shoulder. Roadways shall be designed for a minimum 25 mile per hour design speed

5. The pavement return radius at all intersections shall be a minimum of 35 feet

6. All stormwater from the roadways shall be contained on the plat and shall utilize surface infiltration (ditches, swales, ponds) for detention. The developer shall have an infiltration test performed at each proposed detention area. Tests shall be done with an infiltrometer using the falling head or constant head method. Other methods of infiltration rate determination shall be approved by the County.

7. The developer shall provide a complete stormwater runoff report developed in accordance with the Stormwater Management Manual for Eastern Washington accosting for all impervious and pervious surfaces draining to the roadside ditches. Design storm shall be a Modified SCS Type IA with a 25-year return frequency.

8. All signage including but not limited to stop signs, speed limit signs and street name signs shall be installed by the developer in accordance with Benton County Standard Plans

9. All new power, telephone, cable TV and irrigation shall be installed outside of the County right of way in the appropriate easements. Domestic water piping may be installed within the County right of way in accordance with a valid franchise agreement

10. Survey monuments, with cases and covers per Benton County Standard R-14B, shall be placed at all road intersections, points of curvature, points of tangency, centers of cul-de-sacs, section corners and quarter corners. All monuments shall be set by a Professional Land Surveyor licensed to practice in the state of Washington

11. Dedicate 60 feet for County right of way extending from the cul-de-sac to the boundary line of lot 6 and 7

12. Existing multi use access to Clodfelter shall be improved to meet current County standards

13. Access to parcels 123881012842001, 123881012842003, 123881011085002, 123881011375002, 123881012341002 shall be provided to the new County road, following standard R-3
14. Pave the access from E 297 PR SE to the proposed new road following standard R-4 Urban Local Access
    https://www.co.benton.wa.us/files/documents/R-4Standardasof4-25-20172151135250305l9AM.pdf

Add the following notes to the face of the final plat

1. Benton County is not responsible for the maintenance or upkeep of any stormwater retention facility or drainage easements. All such maintenance and upkeep are the responsibility of the underlying property owner.

2. Prior to the construction of any driveway or the issuance of any building permit for any lot within this subdivision the property owner shall obtain a Road Approach Permit from the Benton County Public Works Department and install the required temporary construction access

3. No trees, shrubs, weeds, fencing or other obstructions more than 24 inches in height are permitted within Benton County right of way

4. Property owners that install grass, curbing, rock mulch or other landscaping within the County right of way do so at their own risk. The County will not repair or replace damaged landscaping due to construction or maintenance operations

5. No lot in this subdivision shall have direct access to Clodfelter Road

6. Lots 4 and 5 shall not have direct access to 297 PR SE

PCM 1.16

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
1250 West Alder Street • Union Gap, Washington 98903-0009 • (509) 575-2490

June 7, 2021

Michelle Cooke
Benton County Planning
PO Box 910
Prosser, WA 99350

Re: SEPA Register 202102638, SUB 2021-004, EA 2021-014

Dear Michelle Cooke:

Thank you for the opportunity to comment during the Optional Determination of Non Significance process for the Mammoth Acres subdivision, proposed by Rob Duncan. We have reviewed the documents and have the following comments.

WATER QUALITY

Project with Potential to Discharge Off-Site
If your project anticipates disturbing ground with the potential for stormwater discharge off-site, the NPDES Construction Stormwater General Permit is recommended. This permit requires that the SEPA checklist fully disclose anticipated activities including building, road construction and utility placements. Obtaining a permit may take 38-60 days.

The permit requires that a Stormwater Pollution Prevention Plan (Erosion Sediment Control Plan) shall be prepared and implemented for all permitted construction sites. These control measures must be able to prevent soil from being carried into surface water and storm drains by stormwater runoff. Permit coverage and erosion control measures must be in place prior to any clearing, grading, or construction.

In the event that an unpermitted Stormwater discharge does occur off-site, it is a violation of Chapter 90.48 RCW, Water Pollution Control and is subject to enforcement action.

More information on the stormwater program may be found on Ecology's stormwater website at: http://www.ecy.wa.gov/programs/wq/stormwater/construction/. Please submit an application or contact Lloyd Stevens, Jr. at the Dept. of Ecology, (509) 574-3991 or email lloyd.stevensjr@ecy.wa.gov , with questions about this permit.

WATER RESOURCES

In Washington State, prospective water users must obtain authorization from the Department of Ecology before diverting surface water or withdrawing ground water, with one exception. Ground water withdrawals of up to 5,000 gallons per day used for single or group domestic supply, up to 5,000 gallons per day used for industrial purposes, stock watering, and for the irrigation of up to one-half acre of non-commercial lawn and garden are exempt from the permitting process. Water use under the RCW 90.44.050 exemption establishes a water right that is subject to the same privileges, restrictions, laws and regulations as a water right permit or certificate obtained directly from Ecology.

If you have any questions or would like to respond to these Water Resources comments, please contact **Christopher Kossik** at (509) 454-7872 or email at christopher.kossik@ecy.wa.gov .

Sincerely,

Gwen Clear

Gwen Clear
Environmental Review Coordinator
Central Regional Office
(509) 575-2012
crosepa@ecy.wa.gov

Donna Hutchinson

From: Rebecca Warrington <rebeccaw@bfhd.wa.gov>
Sent: Wednesday, June 9, 2021 3:49 PM
To: Donna Hutchinson
Cc: Justin Gerber
Subject: [EXTERNAL] RE: Notice of Application EA 2021-014 Mammoth Acres Subdivision

EXTERNAL EMAIL WARNING!!!: This email originated from outside of Benton County. DO NOT click links or open attachments unless you recognize the sender and know the content is safe.

Good afternoon Donna,

We don't have comments at this time on the SEPA checklist. Just on the notes for the final plat the statement below needs to be included:

> "This plat appears to have suitable conditions for the use of on-site sewage disposal systems. However, because of the nature of the testing methods used, we have no way of determining whether each lot can comply with Benton-Franklin Board of Health Rules and Regulation at the time of permit issuance. Further be advised this department's approval of any lot within this plat for the use of on-site sewage disposal systems may be contingent upon that lot passing additional soil inspections, percolation tests, and/or other requirements at a later date."

Thank you. Have a great afternoon!

Please feel free to contact me with questions or concerns.

Thank you,

Rebecca Warrington
Environmental Health Specialist
Land Use, Sewage and Water Section

Benton-Franklin Health District
7102 W. Okanogan Place
Kennewick, WA 99336
p: 509.460.4335
www.bfhd.wa.gov rebeccaw@bfhd.wa.gov

Follow us on

From: Donna Hutchinson <Donna.Hutchinson@co.benton.wa.us>
Sent: Tuesday, June 8, 2021 2:28 PM
To: Rebecca Warrington <rebeccaw@bfhd.wa.gov>; Deana Chiodo <deanac@bfhd.wa.gov>; JoDee Peyton <Jodeer@bfhd.wa.gov>
Subject: FW: Notice of Application EA 2021-014 Mammoth Acres Subdivision

PCM 1.18

BENTON COUNTY WA
PUBLIC WORKS DEPARTMENT

TO: PLANNING DEPARTMENT

FROM: DOUGLAS D'HONDT

CC: CRISTINA WOODS

DATE:6/16/2021

SUBJECT: CLARIFICATION TO WHICH PORTION OF 297 PR SE IS TO BE IMPROVED AS REQUESTED IN THE PRELIMINARY PLAT COMMENTS SENT ON 6/7/2021 –SUB 2021-004 MAMMOTH ACRES & EA 2021-014

Public Works is requesting mitigation to the impact this development will have to the existing residents being served by 297 PR SE. The portion of 297 PR SE on parcel 123881008888888 and the portion East of the new proposed road shall be improved to meet current County standards, and 60 feet of right of way shall be dedicated to the County. That portion West of the new proposed road shall remain in its current condition except for the addition of a paved road approach connecting to the new proposed road, following standard R-4.