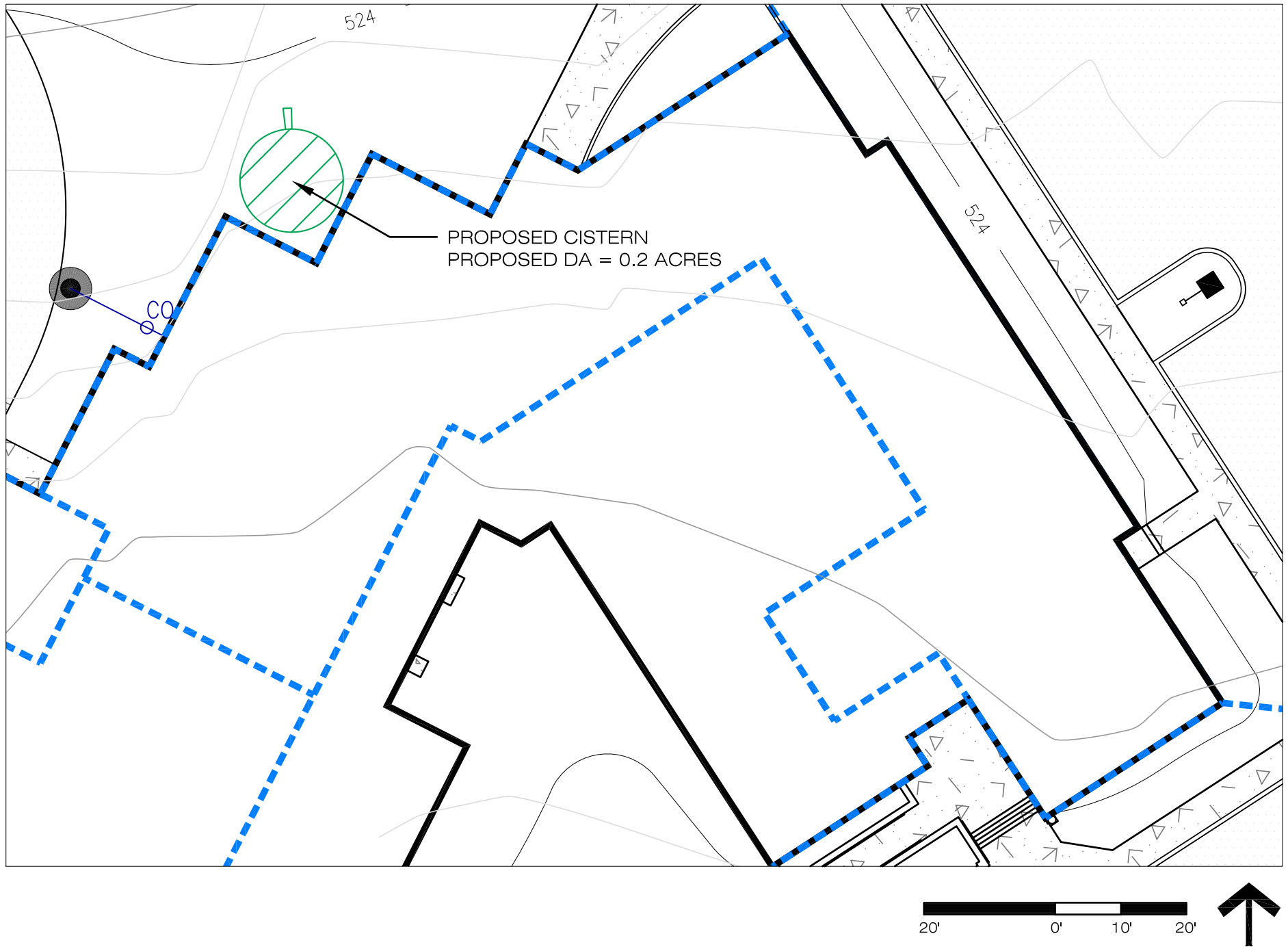

PROPOSED DRAINAGE AREA CHARACTERISTICS:
AREA = 0.2 ACRES
IMPERVIOUS ACREAGE = 0.2 ACRES
CURVE NUMBER: 98
TIME OF CONCENTRATION: 5 MINUTES
1 YR DISCHARGE = 0.51 CFS
2 YR DISCHARGE = 0.78 CFS
10 YR DISCHARGE = 1.33 CFS

CISTERN:
DESIGNED USING VA DEQ CISTERN DESIGN SPREADSHEET
ASSUMED:
- 0.2 ACRES OF ROOF DRAINAGE TO CONTRIBUTE TO CISTERN RUNOFF
- ASSUMED THAT MANAGED TURF AREA IN PROJECT SITE WOULD BE IRRIGATED DURING GROWING SEASON
-ASSUMED 70 PEOPLE WORK IN BUILDING

CISTERN REQUIRED TO HAVE 90% EFFICENCY

Cistern Storage Associated with Design Volume (gallons)	Average Annual Overflow days for storms <=1" (days/year)*	Average Annual Overflow Volume for storms <= 1" (1000's gal/year)*	Runoff Reduction Volume Credit
1,000	39	54	50%
2,000	28	35	67%
3,000	21	24	78%
5,000	12	14	87%
7,000	9	11	90%
10,000	7	8	92%
13,000	5	7	94%
18,000	4	5	95%

ACCORDING TO SPREADSHEET, THE TANK MUST BE 7,000 GALLONS IN ORDER TO BE 90% EFFICIENT

SEE FIGURE 1 ON THIS SHEET TO REVIEW SPREADSHEET TANK ASSUMPTIONS

PHOSPHOROUS REDUCTION CALCULATIONS:
LOAD TO BMP = 0.43 LBS
MASS LOAD EFFICIENCY = 90%
VOLUME TO BMP = 690 C.F.
RUNOFF REDUCTION BY PRACTICE
=621 C.F.
TOTAL PHOSPHOROUSLOAD REDUCTION BY PRACTICE
=0.40 LB/YR
REMAINING PHOSPHOROUS LOAD AFTER TREATMENT
=0.04 LBS

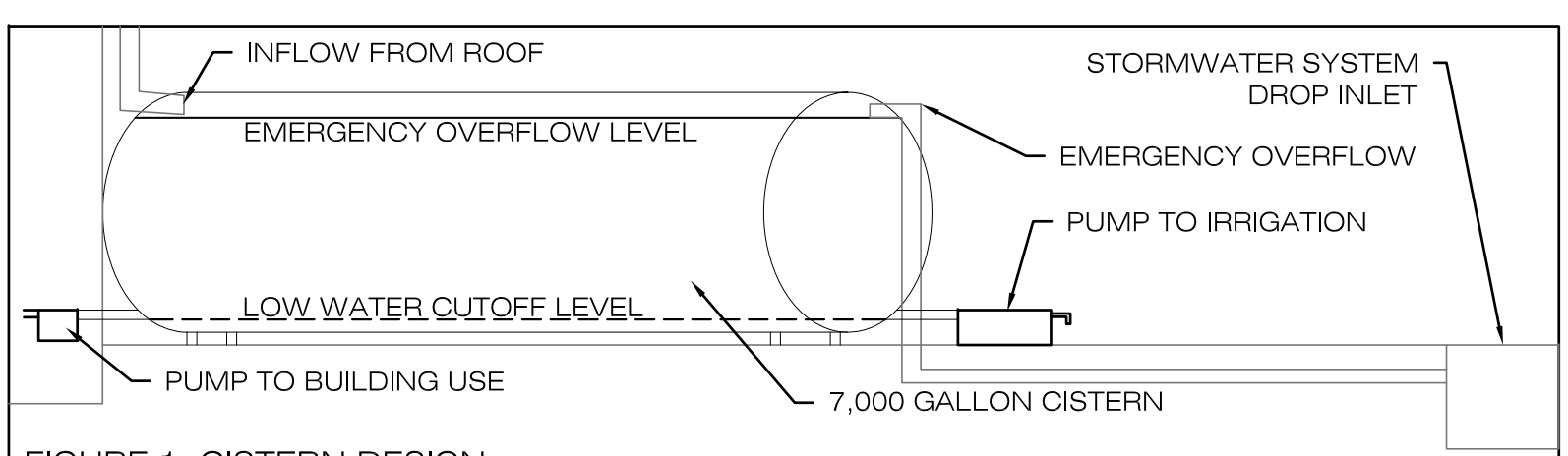

FIGURE 1: CISTERN DESIGN

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

APRIL 2014

SMALLTOWN, VIRGINIA
DEPARTMENT OF PUBLIC WORKS

SITE PLANNING DIVISION

EXERCISE 5
T&L COMMERCIAL DEVELOPMENT
CISTERN DESIGN

DEQ TRAINING CASE STUDY

SCALE 1"=40'
DESIGNED BY: K PROPST
DRAFTED BY: K PROPST
CHECKED BY: J SMITH

REVISIONS	DESCRIPTION	BY	APPROVED	DATE

APPROVED BY SITE PLANNING DIVISION