4. Miscellaneous Provisions.

4.1 Obligations with respect to easement.

4.1.1 Use of trail easement.

MDNR will construct and the MDNR and Trail Management Council referred to in the Plan ("TMC") will manage the trail in a manner that will not cause harm, loss, damage, or unreasonable interference with the adjoining fee owners' peaceable use, enjoyment and possession of their property.

The Plaintiffs will allow MDNR to develop and construct a trail within the parameters set forth above in paragraph 3 and its subparts, and will not cause harm, loss, damage, or interfere with the use of the easement by the MDNR and the public. Plaintiffs agree to cooperate with MDNR and the Trail Management Council to eliminate objects, obstructions or visual barriers adjacent to the trail which pose a danger to lawful users of the trail and pedestrians crossing the trail.

Nothing may be placed, parked or stored on the trail easement, and violations of this provision may be enforced by the Trail Management Council, the MDNR or Benzie County and the expense shall be charged to the responsible party.

4.1.2 No duty of Adjoining Owners to maintain easements.

Neither the Trust, nor any subsequent owner of the fee to the right-of-way, shall have any obligation to build, repair or maintain the easements described in this Agreement, except to the extent required by paragraph 3.2 of this Agreement.

Grade

Grades on bicycle paths should be kept to a minimum, especially on long inclines. Grades greater than 5 percent are undesirable because the ascents are difficult for many bicyclists to climb and the descents cause some bicyclists to exceed the speeds at which they are competent. Where terrain dictates, grades over 5 percent and less than 500 feet (150 m) long are acceptable when a higher design speed is used and additional width is provided. Grades steeper than 3 percent may not be practical for bicycle paths with crushed stone surfaces.

Sight Distance

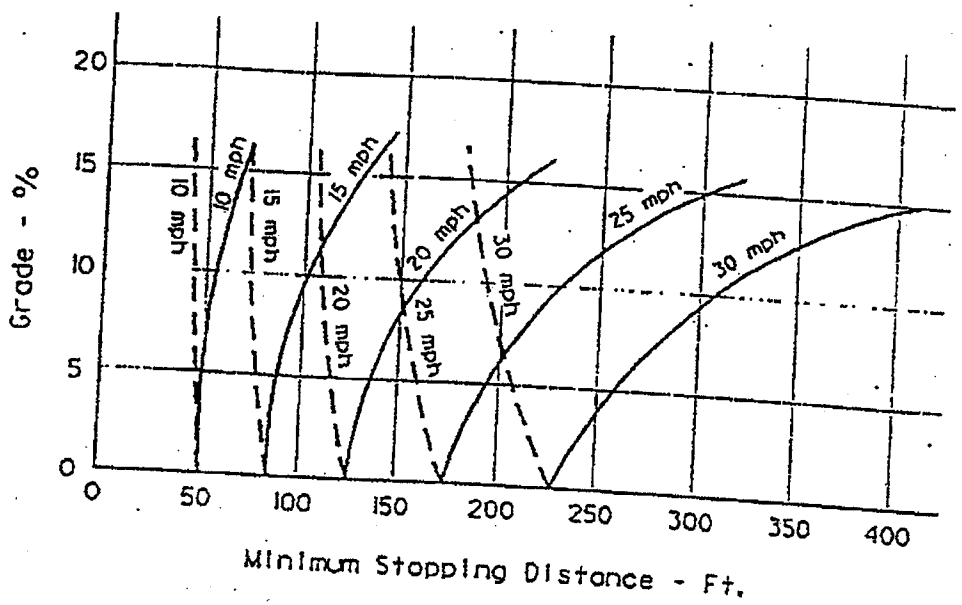
To provide bicyclists with an opportunity to see and react to the unexpected, a bicycle path should be designed with adequate stopping sight distances. The distance required to bring a bicycle to a full controlled stop is a function of the bicyclist's perception and brake reaction time, the initial speed of the bicycle, the coefficient of friction between the tires and the pavement, and the braking ability of the bicycle.

Figure 9 indicates the minimum stopping sight distance for various design speeds and grades based on a total perception and brake reaction time of 2.5 seconds and a coefficient of friction of 0.25 to account for the poor wet weather braking characteristics of many bicycles. For two-way bicycle paths, the sight distance in descending direction, that is, where "G" is negative, will control the design.

Figure 10 is used to select the minimum length of vertical curve necessary to provide minimum stopping sight distance at various speeds on crest vertical curves. The eye height of the bicyclist is assumed to be 4.5 feet (1.4 m) and the object height is assumed to be zero to recognize that impediments to bicycle travel exist at pavement level.

Figure 11 indicates the minimum clearance that should be used to line of sight obstructions for horizontal curves. The lateral clearance is obtained by entering Figure 11 with the stopping sight distance from Figure 9 and the proposed horizontal radius of curvature.

Bicyclists frequently ride abreast of each other on bicycle paths and, on narrow bicycle paths, bicyclists have a tendency to ride near the middle of the path. For these reasons, and because of the serious consequences of a head on bicycle accident, lateral clearances on horizontal curves should be calculated based on the sum of the stopping sight distances for bicyclists traveling in opposite directions around the curve. Where this is not possible or feasible, consideration should be given to widening the path through the curve, installing a yellow center stripe, installing a curve ahead warning sign in accordance with the *MUTCD*, or some combination of these alternatives.



$$S = \frac{V^2}{30(f \pm G)} + 3.67\ V$$

Where: S = Minimum Sight Distance, Ft.
V = Velocity, mph
f = Coefficient of Friction (use 0.25)
G = Grade Ft./Ft. (rise/run)

Decend (-G) ————
Ascend (+G) — — — —

(Metric Conversion: 1 Ft. = 0.3 m, 1 mph = 1.6 km/h)

Figure 9. *Minimum Stopping Sight Distances.*

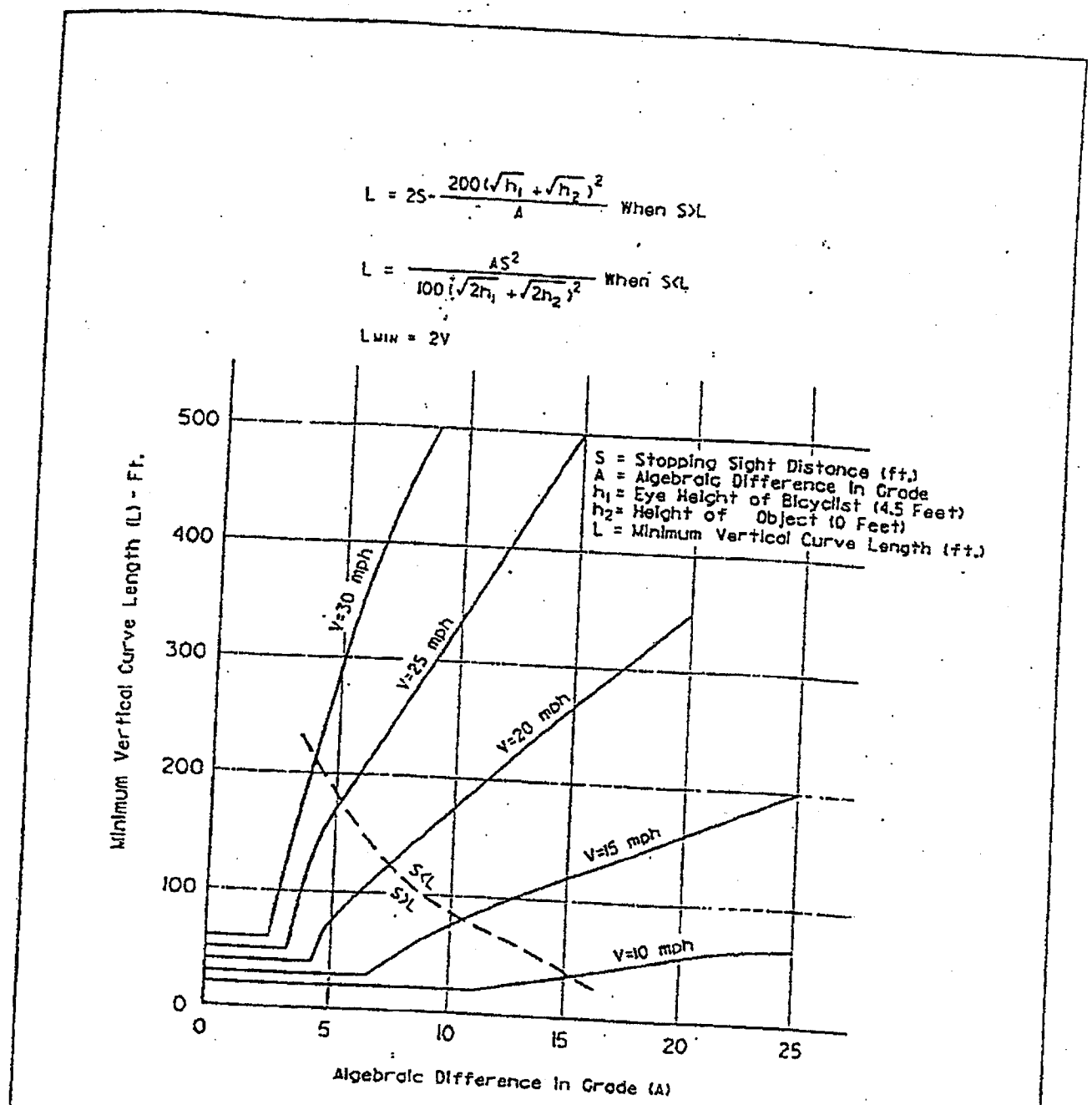
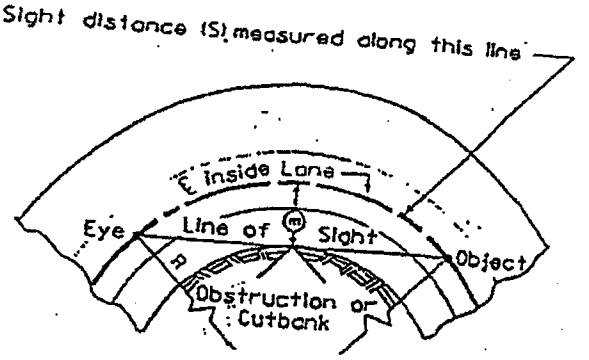


Figure 10. *Minimum Length of Vertical Curves.*



Line of sight is 2.0' above ℄ inside lane at point of obstruction.

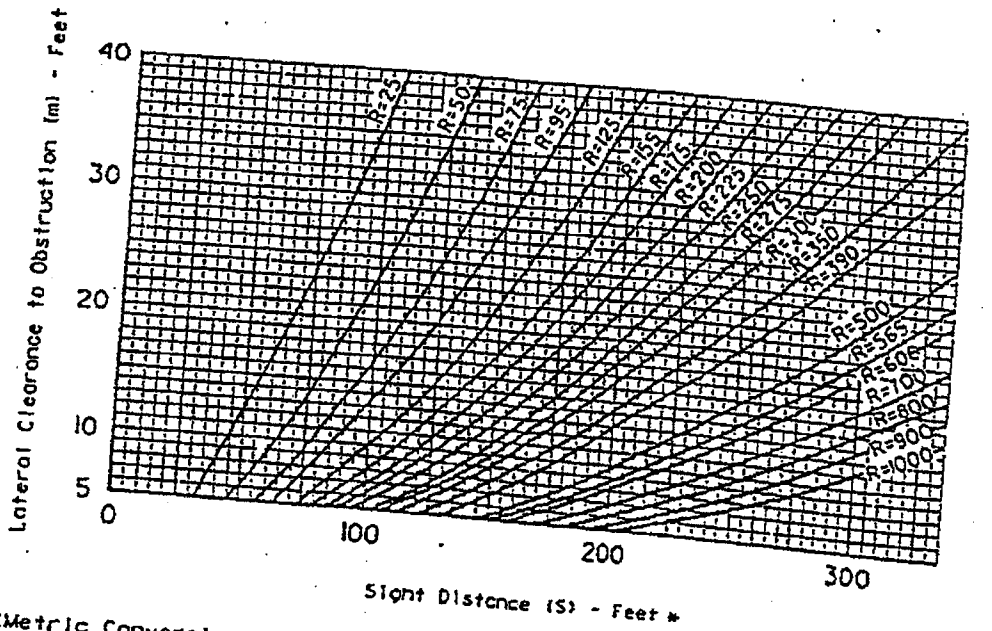
S = Sight distance in feet.
R = Radius of ℄ inside lane in feet.
m = Distance from ℄ inside lane in feet.
V = Design speed for S in mph

Angle is expressed in degrees

$$m = R\left[\text{vers}\left(\frac{28.65S}{R}\right)\right]$$

$$S = \frac{R}{28.65}\left[\cos^{-1}\left(\frac{R-m}{R}\right)\right]$$

Formula applies only when S is equal to or less than length of curve.



(Metric Conversion: 1 Ft. = 0.3 m.)

* Lateral clearances on horizontal curves should be calculated based on the sum of the stopping sight distances for bicyclists travelling in opposite directions around the curve. See text for additional discussion.

Figure 11. *Minimum Lateral Clearances on Horizontal Curves.*