$$\min_{\{x_e\}_{e\in E}} \left(\sum_{t\in T} d_t\, u_t\right) c_c + \left(\sum_{e\in E} x_e\, l_e\right) c_e + \left(\sum_{e\in\delta^+(r)} x_e\right) c_r \quad \Big\} \text{ Minimize total cost}$$

$$\left.\begin{array}{l} \displaystyle\sum_{e\in\delta^-(j)} x_e \begin{cases} = 0 & j = r \\ = 1 & j \in T \\ \leq 1 & j \in V \setminus T \end{cases} \\[2ex] \displaystyle\sum_{e\in\delta^+(r)} x_e \geq 1 \end{array}\right\} \text{ Solution is a } \textit{tree}$$

$$\left.\begin{array}{l} \forall j \in V \cup \{r\},\ d_j \leq \left(\displaystyle\sum_{e\in\delta^-(j)} x_e\right) d_M \\[2ex] \forall (i,j) \in A \begin{cases} d_j - d_i \geq l_{ij}\ x_{ij} - d_M\,(1 - x_{ij}) \\ d_j - d_i \leq l_{ij}\ x_{ij} + d_M\,(1 - x_{ij}) \end{cases} \end{array}\right\} \text{ Cable length is no more than } d_M$$

$$\left.\begin{array}{l} \forall e \in A,\ n_e \leq x_e\, n_M \\[2ex] \displaystyle\sum_{e\in\delta^-(j)} n_e - \sum_{e\in\delta^+(j)} n_e = \begin{cases} p_j & j \in T \\ 0 & j \in V \setminus T \end{cases} \\[2ex] \displaystyle\sum_{e\in\delta^+(r)} n_e = \sum_{i\in T} u_i \end{array}\right\} \text{ Users per group are up to } n_M$$

$$\forall e \in A,\ x_e \in \{0, 1\},\ n_e \in \mathbb{N} \cup \{0\},\ \forall j \in V \cup \{r\},\ d_j \geq 0$$